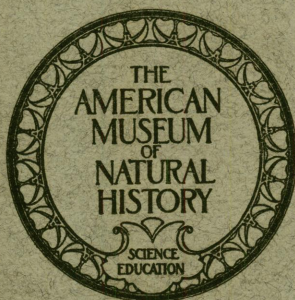


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Article I.—THE ORTHOPTERA OF THE WEST INDIES
NUMBER 1. BLATTIDÆ

BY JAMES A. G. REHN AND MORGAN HEBARD

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA

PLATES I TO XXV

A number of years ago Dr. Frank E. Lutz, Curator of Entomology in The American Museum of Natural History, placed in our hands for study a small collection of Orthoptera from the island of Dominica, which was followed from time to time by series from Cuba, Hispaniola, Jamaica, and that from Porto Rico taken on the New York Academy of Sciences' survey of the latter island. The study of these series progressed very slowly by reason of various impediments, but the delay has, as a whole, proved beneficial by having altered the original character of the studies. Numerous other series, chiefly small but of great importance, received from other sources during the progress of the work, made it desirable to change the contemplated report into a comprehensive study of the Orthoptera of the West Indies. The large proportion of the species known from the Antilles, which were contained in the combined collections, forced a realization of the desirability, from a variational as well as a distributional standpoint, of presenting our results in a single series.

When the general conclusions had been sufficiently analyzed to make evident some of the more important gaps in our knowledge of the Orthoptera of the West Indies, the senior author made a special examination of the Blue Mountain region of Jamaica to secure material from that most interesting area, regarding the Orthoptera of which but little information was available.

The scope of the study will be the orthopterous fauna of the Greater and Lesser Antilles, Trinidad and Tobago being considered South

America and therefore excluded from our treatment. The collections from the Greater Antilles are quite representative, although certain regions, as the more elevated sections of eastern Cuba and the higher areas of Hispaniola, have received but little attention. With the representation from the Lesser Antilles we feel much less satisfied, as no work even approximating a comprehensive character has been done on any of the islands except Antigua, Dominica, St. Lucia, St. Vincent, Grenada and Barbados, with the other islands represented only by scattered records. It is greatly desired that thorough field work be done at an early date on such of the islands as have not been completely altered by man, as by this method alone can we secure a fair idea of the endemic fauna before the primæval conditions are obliterated. Work on islands which have been markedly changed by cultivation is also of importance, as certain peculiar species may remain, adapted to a new character of environment due to the cultivation of the land.

The more important contributions to our knowledge of the Orthoptera of the West Indies are not numerous, when allowance is made for the close association which for so long has existed between the various islands and European countries. The more noteworthy papers number fourteen, and are listed below.¹ Bolivar's Cuban 'Enumération' can well be selected

BAHAMAS

MORSE, ALBERT, P. 1905. 'Some Bahaman Orthoptera.' *Psyche*, XII, pp. 19-24.

REHN, JAMES A. G. 1906. 'The Orthoptera of the Bahamas.' *Bull. Amer. Mus. Nat. Hist.*, XXII, pp. 107-118.

CUBA

GUÉRIN-MÉNEVILLE, F. E. 1857. In Sagra, Ramon de la., 'Histoire Physique, Politique et Naturelle de l'Ile de Cuba. Animaux Articulés a Pieds Articulés. Orthoptera,' pp. 328-358, Pl. xii.

BOLIVAR, IGNACIO. 1888. 'Enumération des Orthoptères de l'Ile de Cuba.' *Mem. Soc. Zool. France*, I, pp. 116-164.

GUNDLACH, JUAN. 1890-1891. 'Contribucion á la Entomologia Cubana.' II, Pt. 4, 'Ortópteros,' pp. 289-396.

REHN, JAMES A. G. 1909. 'A Catalog of the Orthoptera of Cuba and the Isle of Pines.' Second Report of the Central Experimental Station of the Republic of Cuba, pp. 175-226.

PORTO RICO

GUNDLACH, JUAN. 1887. 'Ortópteros. Fauna Puerto-Riqueña.' *Ann. Soc. Españ. Hist. Nat.*, XVI, pp. 138-150.

REHN, JAMES A. G. 1903. 'Notes on West Indian Orthoptera, with a List of the Species known from the Island of Porto Rico.' *Trans. Amer. Entom. Soc.*, XXIX, pp. 129-136.

REHN, JAMES A. G. 1910. 'On Some Orthoptera from Porto Rico, Culebra and Vieques Islands.' *Bull. Amer. Mus. Nat. Hist.*, XXVIII, pp. 73-77.

WOLCOTT, GEORGE N. 1923. 'Insecta Portoricensis. A Preliminary Annotated Check-list of the Insects of Porto Rico, with Descriptions of Some New Species.' *Journ. Dept. of Agr. of Porto Rico*, VII, No. 1, pp. 5-313. (Orthoptera, pp. 17-30.)

ANTIGUA

CAUDELL, A. N., 1922. 'Report on Orthoptera and Dermaptera collected by the Barbados-Antigua Expedition from the University of Iowa in 1918.' *Univ. of Iowa Studies in Nat. Hist.*, X, No. 1, pp. 19-44.

ST. VINCENT

BRUNNER VON WATTENWYL and REDTENBACHER, J. 1892. 'On the Orthoptera of the Island of St. Vincent, West Indies.' *Proc. Zool. Soc. London*, 1892 pp. 196-221, Pls. xv-xvii.

GRENADA

BRUNNER VON WATTENWYL. 1893. 'On the Orthoptera of the Island of Grenada, West Indies.' *Proc. Zool. Soc. London*, 1893, pp. 599-611, Pl. lii.

BARBADOS

REHN, JAMES A. G. 1905. 'Notes on a Small Collection of Orthoptera from the Lesser Antilles, with the Description of a New Species of *Orphulella*.' *Entom. News*, XVI, pp. 173-182, Pl. viii.

CAUDELL, A. N. See above under Antigua.

as the most important of these systematically, while Gundlach's Cuban and Porto Rican studies are the most valuable in the way of habitat observations. In no case, however, do any of these papers approximate the exhaustive character which is so essential in present-day faunistic work, although their great value and intrinsic merit is conceded.

The present paper, the first contribution of the series, treats of the Blattidæ, or cockroaches, one of the most difficult and taxonomically the most sadly involved of the West Indian families of the order. The taxonomic questions have frequently made necessary exhaustive comparisons with Central and South American forms, with which West Indian material has been confused. The possession in the Philadelphia collections of the mainland forms involved, has made the results far more definite and faunistically more significant than would otherwise have been possible.

In the present study forty-seven genera of Blattidæ are treated, of which nine are described as new. One hundred and fifty-six species are admitted as West Indian, of which sixty-six were previously undescribed. Of the total number, we have examined West Indian material of all but sixteen species, while of this assemblage five are of doubtful validity as specific entities or as West Indian forms. Fourteen names which have stood as valid species in the literature are here synonymized for the first time, while seven previously little-known or imperfectly understood species are first correctly placed and compared.

In the present study we have made no effort to present any general conclusions as to the relationship of the faunas of the different islands, or their possible derivation, neither have we endeavored to analyze the information here presented from the standpoint of the general origin or origins of the West Indian orthopterous fauna. Our intention is to discuss the faunistic and geographic evidence secured from the collections of the whole order, in a summary at the close of the series, there presenting any conclusions which may be reached on the basis of evidence collated from the systematic treatments.

The total number of specimens of Blattidæ examined is 1292, the larger representations being from the following collections: American Museum of Natural History, 463; Academy of Natural Sciences of Philadelphia, 393; Hebard Collection, 176; United States National Museum, 122; Paris Museum, 36 and Museum of Comparative Zoölogy, 34, while series have also been examined from the Davis Collection, Cornell University, Porto Rico Department of Agriculture, Brooklyn Institute of Arts and Sciences, Jamaica Department of Agriculture,

British Museum of Natural History, and the Museum of the University of Michigan.

We wish to express our thanks to the officials of the above institutions for their kind coöperation, while particular obligation should be expressed to Mr. Charles T. Ramsden, of Guantanamo, Cuba; Senor José Cabrera, of Cotorro, Cuba; Mr. C. C. Gowdey, Government Entomologist of Jamaica, and Mr. George N. Wolcott, Chief of the Division of Entomology of the Department of Agriculture of Porto Rico, for their cordial responses to inquiries, and the liberality with which they placed in our hands material of great service in this study. It is a pleasure to acknowledge the kind assistance rendered by Mr. B. Uvarov, of the British Museum of Natural History, who compared material and sketches with Walkerian types in that institution and supplied drawings and notes bearing on doubtful determinations.

The material referred to in the following pages without indication of source is understood to be in the collection of The American Museum of Natural History, while the representations from other institutions are accompanied by the name of the institution or a suitable abbreviation of the same.¹

Ectobiinæ

Anaplecta lateralis Burmeister

A[naplecta] lateralis EURMEISTER, 1838, 'Handb. der Entom.,' II, Abth. 2, pt. 1, p. 494. Colombia.

Brunner² has recorded this species from the Chantilly Estate, Grenada, and we have had the opportunity of examining a single individual of this material, belonging to the British Museum. This specimen lacks the abdomen and no comparison of genital appendages or abdominal characters can be made. The wing structure and the pronotal and tegminal features fully agree with a considerable series of *lateralis* from Panama. We have compared the Grenada specimen with material of *A. grandipennis*, *replicata*, *fallax*, *domestica*, *decipiens*, and the form which we feel probably represents DeGeer's *minutissima*, described from the Guianas. From all of these the Grenada material is appreciably different. It is probable that *lateralis* will be found to have an extensive range in northern South America.

¹A. N. S. P. = The Academy of Natural Sciences of Philadelphia; Heb. Cln. or Hebard Cln. = Hebard Collection at The Academy of Natural Sciences of Philadelphia; U. S. N. M. = United States National Museum; Paris Museum = Museum National de Histoire Naturelle, Paris, France; M. C. Z. = Museum of Comparative Zoölogy; Davis Cln. = Collection of William T. Davis; P. R. Dept. of Agr. = Porto Rico Department of Agriculture; Brooklyn Inst. = Brooklyn Institute of Science and Art; Jam. Dept. of Agr. = Department of Agriculture of Jamaica; Brit. Mus. Nat. Hist. = British Museum of Natural History; Univ. of Mich. Mus. = Museum of the University of Michigan.

²1893, Proc. Zool. Soc. London, 1893, p. 601.

There is no other West Indian record of this genus, which is tropical African and American, but predominatingly tropical American. However, all the species are small and easily overlooked, even where numerous.

Pseudomopinæ

This subfamily is an enormous complex, comprising a great number of genera and a multitude of species, distributed over the entire world. But a single species (*Blattella germanica*) has developed a really cosmopolitan distribution, although a number of the forms are widely distributed within the tropics. The complexity of structure in the species of this subfamily is most extraordinary, particularly in the way of genital and secondary sexual features of the male sex. Taxonomic work in this division of the Blattidæ is extremely difficult, as but a limited portion of the species of the world known today have been studied in the light of modern standards for generic entities and genera groups.

We are presenting here a key to the genera of the subfamily found in the West Indies, an admittedly artificial dichotomous table which will serve, we trust, to aid the student in correctly placing most of his material. It has been constructed largely from the key to the described American genera of the subsidiary group Blattellæ published by the junior author in 1920.¹ This has been condensed to include the then known genera occurring in the West Indies, the new ones of the group here described have been added and the other groups of the subfamily have been analyzed, added, or interpolated. We are fully aware of the artificial character of this key and do not wish it to be regarded as the authors' conception of a phylogenetic presentation of the genera, but the production of a more logically natural key is not possible until we know more of the South American forms of the subfamily. We sincerely hope to be able to present a comprehensive table for the genera, or at least the American ones, of the Pseudomopinæ in the not distant future.

GENERA OF THE PSEUDOMOPINÆ OCCURRING IN THE WEST INDIES

1. Ulnar vein of wing with all rami complete, reaching to distal margin of wing. 2.
 Ulnar vein of wing with distal rami complete and reaching to distal margin of wing, proximal rami incomplete and short, diverging toward dividing vein and not reaching distal margin of wing. (Ischnopterae) 11.
2. Vento-cephalic margin of cephalic femora with a row of spines which decrease suddenly in size mesad, those distad and before apical group being piliiform, termed "type B"; or armed with a row of spines which are entirely piliiform. (Tarsal claws unspecialized.) 3.

¹Mem. Amer. Entom. Soc., No. 4, pp. 26-28.

- Ventro-cephalic margin of ventro-cephalic femora with a row of spines which decrease gradually in size, termed "type A." (Arolia present.) 6.
3. Pulvilli on fourth tarsal joint only¹. 4.
 Pulvilli on all four proximal tarsal joints. (Ventro-cephalic margin of cephalic femora with group of three heavy distal spines.) 5.
 4. General form depressed, deplanate, delicate. Ventro-cephalic margin of cephalic femora with group of three heavy distal spines. Tegmina elongate, with discoidal sectors perfectly longitudinal. Tegminal color pattern venational in disposition. Dorsal surface of male abdomen with sixth tergite specialized. *Euphyllodromia* Shelford.
 General form ovate, subconvex, robust. Ventro-cephalic margin of cephalic femora with group of two heavy distal spines. Tegmina never elongate, subcoriaceous, with discoidal sectors oblique or occasionally subobsolete (*A. gemma*). Tegminal color pattern not venational in disposition. Dorsal surface of male abdomen unspecialized. *Aglaopteryx* Hebard.
 5. Tarsal claws asymmetrical. Tegmina with discoidal sectors oblique. Dorsal surface of male abdomen specialized. (Form broad.) . . . *Latiblattella* Hebard.
 Tarsal claws symmetrical. Tegmina with discoidal sectors longitudinal. Dorsal surface of male abdomen unspecialized. . . . *Chromatonotus* Hebard.
 6. Tegmina with discoidal sectors oblique. Tegmina and wings fully developed in male, reduced in female. (Tarsal claws unspecialized. Inter-ocular-ocular area raised and flattened, particularly in male.) *Supella* Shelford.
 Tegmina with discoidal sectors longitudinal. Tegmina and wings fully developed in male, fully developed or slightly reduced in female. 7.
 7. Ventro-cephalic margin of cephalic femora with group of two heavy distal spines. Tarsal claws specialized on margins. 8.
 Ventro-cephalic margin of cephalic femora with group of three heavy distal spines. Tarsal claws unspecialized. *Blattella* Caudell.
 8. Ventro-caudal margin of cephalic femora with two spaced and one distal spine.² (Size small for group. Dorsal surface of male abdomen unspecialized.) *Cariblatta* Hebard.
 Ventro-caudal margin of cephalic femora with three or more spaced and one distal spines. (Dorsal surface of male abdomen unspecialized or specialized.) 9.
 9. Head not strongly depressed and transverse, face not strongly deplanate. Pronotum transverse ovate or moderately elliptical, very rarely strongly transverse elliptical. Scapular field of tegmina of moderate width, distinctly less than equal or subequal to that of discoidal field of same. Form of tegmina elongate elliptical. 10.
 Head very strongly depressed and transverse, face strongly deplanate. Pronotum very strongly transverse elliptical. Scapular field of tegmina very broad, near middle of tegmina slightly broader than discoidal field at same point. Form of tegmina more acute, ovate lanceolate. (Dorsal surface of male abdomen unspecialized.) *Nymphodromia*, new genus.
 10. Size small; form elongate, very slender. Tegmina narrow. Pronotum markedly deplanate. Tarsal claws with ventral margins weakly specialized. (Coloration marked bicolored.) *Cariblattoides*, new genus.

¹Occasionally by the loss of one joint the pulvillus appears to be on the third joint.

²Rarely more than two spaced spines are present, but this condition is quite the exception.

- Size medium small to relatively large (for the group); form elongate elliptical, very rarely as slender as in *Cariblattoides*. Tegmina more lanceolate. Pronotum less deplanate (except in *carrikeri* group). Tarsal claws with ventral margins distinctly specialized. *Neoblattella* Shelford.
11. Ventro-cephalic margin of cephalic femora armed with heavy proximal spines, succeeded distad by a series of minute, closely-set piliform spines, and finally three heavy elongate distal spines. 12.
- Ventro-cephalic margin of cephalic femora armed with heavy elongate spines, decreasing gradually in length distad to three longer distal spines. (Pronotum having disk without diverging sulci.) 14.
12. Pronotum with disk bearing a pair of distinct diverging sulci. Tegmina well developed at least in the male sex. Arolia present. 13.
- Pronotum with disk bearing no sulci, regularly convex. Tegmina reduced, not reaching to middle of abdomen. Arolia absent. *Nelipophygus*, new genus.
13. Discoidal vein of wing undivided. Sixth and seventh tergites of male highly specialized, former bearing mesad on ventral surface a moderately projecting pair of chitinous "combs." (Discoidal sectors of tegmina weakly radiating.) *Ischnoptera* Burmeister.
- Discoidal vein of wing bifurcate. Sixth and seventh tergites of male little specialized, former without median pair of chitinous "combs." (Discoidal sectors of tegmina longitudinal.) *Pseudosymploce*, new genus.
14. Fully alate or with truncate tegmina in female sex only (*S. hospes*). Pronotum with caudal margin obtusely produced mesad. Proximal abdominal tergite of male specialized. *Symploce* Hebard.
- Both sexes with reduced truncate or subtrigonal tegmina. Pronotum with caudal margin not produced mesad. Proximal abdominal tergite of male unspecialized. *Nesomyllacris*, new genus.

AGLAOPTERYX Hebard

This tropical American genus is known only from three species, two of which are found in the West Indies, while the third (*A. lita*) is a Panamanian insect.

KEY TO THE WEST INDIAN SPECIES

- Tegmina reaching nearly or quite to apex of abdomen, distad never truncate. Wings present but reduced. Ventro-cephalic margin of cephalic femora with distal group of spines numbering two to three. (Male genitalia distinctive. Solely West Indian and Bermudan in distribution.) *diaphana* (Fabricius).
- Tegmina reaching only to proximal abdominal segments, distad sharply truncate. Wings absent. Ventro-cephalic margin of cephalic femora with a single distal spine. (Male genitalia distinctive. Southeastern United States and Bahamas.) *gemma* Hebard.

Aglaopteryx diaphana (Fabricius)

B[latta] diaphana FABRICIUS, 1792, 'Entom. Syst.,' II, p. 11. Islands of South America (West Indies).

CUBA.—Camoá, Havana Province, X, 1918, (José Cabrera), 1 ♀, [A. N. S. P.]. Santiago, Oriente Province, VIII, 21, 1920, (M. Hebard; from under corky bark of large tree in open), 1 ♂, [Hebard Cln.].

JAMAICA.—Montego Bay, X, 29, 1913, (M. Hebard; in bromeliad on forest tree with *Nyctibora laevigata* and numerous *Cariblatta insularis*), 1 ♀, [Hebard, Cln.].¹ Pleasant Hill, Blue Mountains, 3660–3800 feet, VII, 24 and 25, 1923, (Rehn; from under loose bark of shade trees and hiding in banana blossom bracts), 6♂, 3♀, 1 immat. ♂, 2 immat. ♀, [A. N. S. P.]. Between Pleasant Hill and St. Helens Gap, Blue Mountains, 4400–4700 feet, VII, 24 and 25, 1923, (Rehn; in montane forest, from bromeliads, hollow bases of dead tree fern fronds and from under bark), 1♂, 1♀, 3 immat. ♂, 4 immat. ♀, [A. N. S. P.].

HISPANIOLA.—Aux Cayes, Haiti, III, 15–20, 1922, (F. E. Watson), 1 immat. ♂.

PORTO RICO.—Cayey, Guayama Dept., III, 16, 1917, (R. T. Cotton), 1 ♂, 1 ♀, [U. S. N. M.].

DOMINICA.—Long Ditton, VI, 19, 1911, (Crampton and Lutz), 1 ♀.¹

This beautiful West Indian species is now known to range from the Bermudas, Bahamas (Andros Island) and Cuba, east and south to Barbados, the definite records being from the Bermudas, Bahamas, Cuba, Jamaica, Hispaniola, Porto Rico, Culebra Island, Mona Island, St. Thomas, Dominica and Barbados. Hebard, in his study of the Blattidae of North America,² has given full notes on the species.

Señ has reported the species as occurring in Porto Rico “under bark of trees, in abandoned cocoons of the ‘plumilla’ (*Megalopyge krugii*), also in leaves webbed together by caterpillars and in abandoned spider nests.” Wolcott has reported it from Tallaboa, Pt. Salinas, Cayey, Ciales, Adjuntas and Lares in the same island, and given the following variety of habitats: on rotten wood fence, in empty cocoons of *Megalopyge krugii* on trunks of bucare trees (*Erythrina glauca*), on trunk of *Inga laurina* and in larval tents of *Tetralopha scabridella* on *Inga vera*.

The series from the Blue Mountains of Jamaica exhibits a considerable amount of variation in size, but by no means sufficient to cause any confusion in the recognition of this beautifully marked species. The anchor-shaped median marking of the pronotal disk, which is usually indicated, occasionally disappears, in both adults and immature individuals. This is true of Cuban as well as of Jamaican individuals.

¹Recorded by Hebard, 1917, Mem. Amer. Entom. Soc., No. 2, p. 32, footnote 40.

²Idem.

Aglaopteryx gemma Hebard

Aglaopteryx gemma HEBARD, 1917, Mem. Amer. Entom. Soc., No. 2, pp. 12, 32, Pl. I, figs. 9-12. ♂, ♀; Mobile, Alabama (type locality) and numerous other localities in Texas, Louisiana, Mississippi, Alabama, Georgia and Florida, and Nassau, New Providence, Bahamas.

This species is closely related to, but well distinct from, *A. diaphana*, which it replaces in the southeastern United States, the differences being well set forth in the original description. The only West Indian record of the species is that from Nassau, quoted above. Seven adults from this locality, representing both sexes, taken in January and February, were examined.

It is quite possible that the occurrence of *gemma* in the Bahamas may be due to its accidental introduction from southern Florida, the latter region being in constant touch commercially with the Bahamas. Knowing the secretive habits of the species, the possibility of such an introduction is to us perfectly logical.

LATIBLATTELLA Hebard

This genus is highly developed in continental tropical America, with two species occurring in the United States, one in the extreme southeastern portion (southern Florida) and the other in the southwestern section (southern Arizona). The first of these, *L. rehni* Hebard, occurs also in western Cuba and in the Bahamas. This species and a second one from Jamaica are the only representatives of the genus definitely known to date from the West Indies.

Latiblattella rehni Hebard

Latiblattella rehni HEBARD, 1917, Mem. Amer. Entom. Soc., No. 2, pp. 12, 38, Pl. I, figs. 13-17. ♂, ♀; Newberry, Lakeland, Fort Myers, Punta Gorda, Everglade, Marco, Chuluota, Deerfield, Fort Lauderdale, Ojus, Miami (type locality), Coconut Grove, Homestead, Dade County and Big Pine Key, Florida.

BAHAMAS.—No exact locality, II-V, 1896, [immature specimen], (U. S. Fish Commission), 1 ♀,¹ immat. 1 ♀, [U. S. N. M.].

CUBA.—Twelve and one-half kilometers south of Pinar del Rio, Pinar del Rio Province, IX, 12-23, 1913, (Leng; beaten from pine), 1 immat. ♀.

The Bahaman adult is unusually small when compared with an extensive Floridian series, and, in addition, has the pronotum somewhat more deflexed laterad. The latter condition can be explained by shrivel-

¹This is the specimen recorded by Rehn (1906, Bull. Amer. Mus. Nat. Hist., XXII, p. 110) as *Blattella adspersicollis*, a name at one time erroneously current for the present species.

ling, as both of the Bahaman individuals have been dried from alcohol. There can be no question, however, but that the Bahaman and Cuban specimens listed above are identical with typical material of this hitherto peculiarly Floridian species. While its occurrence in the Bahamas and Cuba might be considered due to accidental introduction, as suggested above in the case of *Aglaopteryx gemma*, it would seem that in Cuba, at least, the habitat notes given above militate against such an interpretation. The Bahaman female measures: length of body, 9.6 mm.; length of pronotum, 2.7; greatest width of pronotum, 4; length of tegmen, 9.8; greatest width of tegmen, 3.3.

In coloration the Bahaman immature specimen has a broad dark band crossing the middle of the dorsum of the abdomen, embracing the fourth and fifth and incompletely suffusing the second and third tergites. The immature specimen from south of Pinar del Rio has the abdomen almost wholly piceous, both above and below, being more uniformly darker on this portion of the body than any Floridian immature specimen seen. The face of this individual is also solidly piceous.

Latiblattella species

JAMAICA.—Balaclava, St. Elizabeth Parish, IV, 15, 1909, (A. E. Wight), 1 ♀, [M. C. Z.].

This single specimen demonstrates the presence of the genus *Latiblattella* in Jamaica, but unfortunately, being a female, its definite determination is very difficult, if possible. The Jamaican individual is exceedingly close to, if distinct from, *L. angustifrons* Hebard,¹ described from Panama, which, however, is known only from the male sex, and in consequence suitable comparison cannot be made. Future work may show that the Panamanian species has been accidentally introduced in Jamaica, possibly through the means of oöthecæ in soil about plants brought back by returned Canal laborers, but it will be necessary to await the receipt of Jamaican males or females from Panama before this question can be definitely settled. The genus *Latiblattella* is a difficult one at best, and without accompanying males we do not wish to place a definite determination on this specimen, although the presence of the genus in Jamaica should be established.

For the benefit of future workers we give the measurements of this Jamaican female: length of body, 12 mm.; length of pronotum, 2.8; greatest width of pronotum, 4.1; length of tegmen, 10.4; greatest width of tegmen, 3.4.

¹1920, Mem. Amer. Entom. Soc., No. 4, p. 39, Pl. II, fig. 22. ♂.

Supella supellectilium (Serville)

Blatta supellectilium SERVILLE, 1839, 'Hist. Nat. Ins., Orth.,' p. 114. ♂, ♀; Mauritius.

Ischnoptera vacillans WALKER, 1868, 'Catal. Blatt. Brit. Mus.,' p. 114. ♂; "St. Domingo."

CUBA.—Pinar del Rio, Pinar del Rio Province, IX, 9-24, 1913, (Leng; in hotel), 1♂. Havana, 1♂, [Paris Museum]. Baracoa, Oriente Province, VIII, 1905, (A. Busck), 2♂, [U. S. N. M.].

JAMAICA.—Kingston, X, 24, 1913, (M. Hebard; in hotel larder), 1♂, [Hebard Cln.]; (Cockerell), 1♀, [U. S. N. M.]. Mandeville, Manchester, about 2250 feet elevation, XI, 26-28, 1919, (F. E. Watson; caught at light), 1♂. Montego Bay, XI, 3, 1913, (M. Hebard), 1♀, [Hebard Cln.].

HISPANIOLA.—Port-au-Prince, Haiti, 2♂, 5♀, [Paris Museum]; about 300 feet elevation, II, 1-5, III, 21-29, 1922, (F. E. Watson; caught at light), 1♂, 1 immat. ♀. La Moriniere, Haiti, about 125 feet elevation, III, 1-5, 1922, (F. E. Watson; caught at light, pair in coitu), 2♂, 1♀, 1 immat. ♂. San Francisco Mountains, 13 kilometers north of San Cristobal, Province of Santo Domingo, Dominican Republic,¹ IX, 1905, (A. Busck), 2♀, [U. S. N. M.].

PORTO RICO.—San Juan, 2♀, [Paris Museum].

Uvarov has kindly examined the type of Walker's *vacillans* and sent us a sketch of the genitalia. His suggestion as to the synonymy of *vacillans* under *supellectilium* is amply supported by a re-examination of the original description, and the genitalic sketch is adequate corroboration. *Vacillans* was based on a pale individual of the species, with tegmina pattern not at all distinct, and we here add another to the long list of synonyms already established.

This circumtropical domiciliary species has been reported from all the Greater Antilles and Barbados, and also occurs in southern Florida. The synonymy is quite extensive, but there is no necessity for its repetition in this connection. The sexes are quite different in general propor-

¹This locality is apparently intended for the group of hills surrounding Naranja Dulce on the Rio Nigua, thirteen kilometers north of San Cristobal, in which region is also the Blanton copper mine referred to elsewhere in this paper. Mr. Busck writes me as follows: "The designation San Francisco Mts., San Domingo is a very poor one and was used by me because at the time—1904—it was a local name used by the few natives in the region where I lived for a few months. I was never able to find it on any map. The locality was in the province of San Domingo, just northeast (*sic*) of Santo Domingo City, one long day's journey (fourteen hours) by mule from the city. There was no town or settlement of any kind, just an old house formerly occupied by a copper mining company. All collections labelled San Francisco Mts. come from localities reached by foot or by mule on one day excursions from that house."

With the aid of the recently issued report of the Geological Survey of the Dominican Republic (1921, Memoirs I, Geological Survey of the Dominican Republic, pp. 236-242, Pl. xxiii), we are able to locate the San Francisco copper property, and find it was near Naranja Dulce on the Rio Nigua, thirteen kilometers north of the town of San Cristobal. It is quite possible that the settlement now called Naranja Dulce includes the house referred to by Mr. Busck.

tions, and the species is very variable in color intensity. Sehn states that in Porto Rico it occurs in houses in company with *Blattella germanica*, while both Gundlach and Wolcott report it from similar habitats in that island, the former from Mayaguez, the latter from Condado, Lares and Arecibo.

CARIBLATTA Hebard

This genus of small cockroaches has its center of greatest differentiation in the West Indies, and specifically the Greater Antilles, Jamaica alone possessing nine of the twenty-seven forms of the genus, all except two peculiar to the island. We believe the genus originated in South America, where it is represented by at least six species, this total including a single Panamanian species, as well as Trinidadian forms. No species are known from Central America north of Panama, or from Mexico, while two forms of a single species (*C. lutea*) occur in the lower sections of the southeastern United States, but do not extend west of the Mississippi River as far as known. This latter species doubtless reached the southeastern United States through or from the West Indies, where one of its forms and all of its near relatives at present occur.

The West Indies possess twenty of the twenty-seven forms of the genus, and of the twenty all but two are restricted to the Greater Antilles and the Bahamas, while these two are limited in distribution to certain of the Lesser Antilles and the Virgin Islands. One species (*delicatula*) has a relatively wide distribution, occurring in all the Greater Antilles except Porto Rico, and also in the Bahamas. This form is not only the most plastic member of the genus, but is also one of the two forms known from Cuba, compared with which, as stated above, nine species are definitely known from Jamaica.

In 1916 the junior author erected the genus *Cariblatia* and published a revision of the genus¹ which has furnished the ground work for the present much more detailed study of the West Indian forms. The handicap at that time was lack of sufficient material to enable the student to secure a suitably definite idea of the variability of one relatively plastic species, i. e., *delicatula*, there called *punctulata*. In consequence, the true range of variation of that, the most widely distributed, species was considered to be greater than we now know to be the case, and certain material there referred to *delicatula* has been found to represent distinct and undescribed species. Features of pronotal pattern elements, elements of facial pattern, interocular width and to a lesser degree tegminal

¹Trans. Amer. Entom. Soc., XLII, pp. 147-186, Pls. xi-xiii.

pattern have been found to indicate group affinities, while the very great differentiation of the male genitalia, almost entirely of the subgenital plate and styles, is mainly specific and often but little in the way of group affinities is there shown.

The distribution of the West Indian species of *Cariblatta* may be graphically presented as follows:

	Bahamas	Cuba	Jamaica	Hispaniola	Porto Rico	Lesser Antilles
<i>Reticulosa</i> Group			*			
<i>reticulosa</i>			*		*	
<i>nebulicola</i>			*			
<i>Delicatula</i> Group						
<i>craticula</i>					*	
<i>picturata</i>					*	
<i>unguiculata</i>				*		
<i>glochis</i>	*			*		
<i>leucops</i>				*		
<i>delicatula</i>	*	*	*	*		
<i>lutea minima</i>		*				
<i>Cuprea</i> Group						
<i>cuprea</i>			*			
<i>orestera</i>			*			
<i>punctipennis</i>						*
<i>Insularis</i> Group						
<i>cryptobia</i>			*			
<i>islacolonis</i>				*		
<i>plagia</i>					*	
<i>stenophrys</i>					*	
<i>antiguensis</i>						*
<i>jamaicensis</i>			*			
<i>insularis</i>			*			
<i>landalei</i>			*			

Hebard in 1916 recognized without names three groups of the genus. It has been necessary to modify considerably this arrangement, and tentatively recognize six groups: the *Reticulosa* Group, the *Delicatula* Group, the *Cuprea* Group, the *Fossicauda* Group, the *Insularis* Group and the *Personata* Group. Of these, the *Fossicauda* and the *Personata* Groups do not occur in the West Indies. The features which we have provisionally utilized to distinguish the groups are often quite subtle and less evident than the male genital characters, which, while of great specific importance, indicate less the probable derivation and phylogenetic relationship.

As is so frequently the case in the Blattidæ, the determination of females without accompanying males is exceedingly difficult, and the differential features here given are almost entirely those of the male sex. A careful study of the pronotal form and pattern, facial and abdominal patterns and, after proper allowance is made for sexual difference, the interocular width, will generally furnish some clues to the location of females, but the differences thus available are usually quite subtle and, without series for comparison, exceedingly difficult to analyze correctly.

With a genus having differential specific characters as difficult to express in words as the present one, the construction of a dichotomous key is exceedingly hard, and at best the result is never completely satisfactory to the reviser. The need for such a key is, however, so imperative that, with a full comprehension of its occasional lack of contrasted definiteness, we have endeavored to construct one which in most cases will prove satisfactory to the student. In every case, nevertheless, we would suggest that use be made of the figures accompanying this paper, or those to which reference is made in the body of the text. It has been necessary to limit the key to the features of the male sex, as the construction of a table for females is, in the case of many of the species, virtually hopeless. We have given, however, under the majority of the species comparative notes which should prove of some value in separating females of the different forms.

The species of this genus inhabit preferably heavy forest, living among the fallen leaves resting on the surface leaf mould, in epiphytic bromeliads and in dead agaves, while *C. landalei* frequents the shelter of banana blossom bracts. *C. delicatula*, however, as one might expect of the most widely distributed member of the genus, is more adaptable than the other forms and also occurs in the open, under rubbish of various kinds in poorly grassed fields. These diminutive insects run about with great speed and take wing readily, though usually flying but short distances.

KEY TO THE WEST INDIAN SPECIES OF *Cariblatta*, BASED ON THE FEATURES OF THE MALE SEX

1. Pronotum with two longitudinal dark bars diverging caudad. [*Reticulosa* Group.] 2.
 Pronotum without two longitudinal dark bars. 3.
2. Size smaller (length of tegmen, 8.4–9.7 mm.). Median portion of distal margin of male subgenital plate subtruncate to weakly arcuate. (Jamaica, Porto Rico.) *reticulosa* (Walker).
- Size larger (length of tegmen, 10.7–11.4 mm.). Median portion of distal margin of male subgenital plate produced into a thickened rounded labiation. (Jamaica.) *nebulicola*, new species.

3. Pronotal pattern of normal intensity consisting of a concentric design of dots and lines, a well-defined median pair of parenthesis-shaped lines, followed caudad by a characteristic group of four or five dots. 4.
 Pronotal pattern consisting only of a pair or a few pairs of median well-separated dots or dashes and a less evident, more caudal and closely placed pair of small points. (Pronotum proportionately larger and more ovate-elliptical.) [*Cuprea* Group.] 17.
4. Pronotal pattern made up more largely of dots, which are more truly concentric in disposition, no supra-cervical markings, the pattern not extending cephalad of the disk. Tegmina without dark lineations of any sort. [*Delicatula* Group.] 5.
 Pronotal pattern with its elements more lineate than in the alternate category, less concentric and with a distinct longitudinal tendency, supra-cervical markings present and usually pronounced. Tegmina generally with dark lineations present to a variable degree on the anal sulcus and on proximal section of humeral trunk. [*Insularis* Group.] 10.
5. Subgenital plate of male developed medio-distad into a projecting, compressed, rostrate finger, broader distad than at its base, sharply delimited by folding of the plate from the infra-stylar portions of the same, which, however, are in contact with the median production. (Face with three broad, regularly spaced dark bars.) (Jamaica.) *craticula* Hebard.
 Subgenital plate of male not compressed rostrate medio-distad, generally produced in some way but never with the projecting rostrate finger found in *craticula*, the production always bordered laterad by emarginations or distinct diastemas. 6.
6. Subgenital plate of male with median production of distal margin acute trigonal, laterad flanked by V-shaped emarginations. 7.
 Subgenital plate of male variable, with median production of distal margin usually not projecting distad of infra-stylar portions of plate, separated from same by deep emarginations, the production when trigonal, rounded and not acute, or the plate has little or no median production and the distal margin is arcuate or nearly straight. 8.
7. Styles of the male subgenital plate of the general type found in most of the species of the genus, without any striking or extraordinary falciform development. (Porto Rico.) *picturata*, new species.
 Styles of the male subgenital plate distad markedly specialized, with a highly developed, falciform structure, as long as the remainder of the style and with a corkscrew-like turn. (Hispaniola) *unguiculata*, new species.
8. Subgenital plate of male with a median finger-like production, which is sharply separated from the lateral portions of the plate by pronounced but narrow U-shaped emarginations, the production not extending distad of the lateral portions of the plate. (Hispaniola.) *leucops*, new species.
 Subgenital plate of male not as in alternate category, with distinct but truncate median production or distal margin arcuate to varying degrees. 9.
9. Subgenital plate of male with a median, projecting, truncate production, this narrow and not broader than long. (Bahamas.) *glochis*, new species.
 Subgenital plate of male very variable, the distal margin rounded trigonal, low and transverse truncate, arcuate or roundly truncate produced, but never

as in alternate category. (Cuba, Bahamas, Hispaniola and Jamaica.)

delicatula (Guérin).

10. Subgenital plate of male with its medio-distal section symmetrically developed; median production, when present, arcuate or transversely truncate, distal section of plate never folded or puckered when seen from venter or in caudal aspect. 11.
- Subgenital plate of male with its distal section unsymmetrically developed; median production, when present, unsymmetrical or the distal section of the plate as a whole is folded or puckered. 13.
11. Median production of distal margin of subgenital plate of male relatively low, transversely subquadrate or arcuato-trigonal. Interspace between eyes of normal width for this sex in genus, no less than occipital depth of eye. . 12.
- Distal margin of subgenital plate very gently arcuate mesad, no distinct median production present, with a pair of elevated rounded subvertical lamellations laterad, these distinctly evident in caudal aspect. Interspace between eyes less than occipital depth of eye. (Jamaica.) . *jamaicensis*, new species.
12. Distal margin of subgenital plate of male between styles transversely subquadrate, infra-stylar emarginations shallow and not marked; venter of plate subdeplanate. Pronotum proportionately shorter, more transverse, more trapezoidal in outline. (Jamaica.) *cryptobia*, new species.
- Distal margin of subgenital plate arcuato-trigonal produced mesad, infra-stylar emarginations extensive; venter of plate markedly elevated into rounded folds cephalad of infra-stylar emarginations. Pronotum proportionately longer, less transverse, more ovate in outline. (Hispaniola.) *islacolonis*, new species.
13. Distal portion of subgenital plate of male not folded or puckered; median production strongly developed, its distal margin obliquely truncate or arcuate. 14.
- Distal portion of subgenital plate of male markedly folded or puckered; median production not strongly developed and its distal margin not obliquely truncate or arcuate. 16.
14. Interspace between eyes very narrow, not greater than one-half occipital depth of eye. (Pronotum shorter, more transverse, elliptico-trapezoidal. Median process of male subgenital plate prominent, lateral margins of same subparallel, distad obliquely arcuate; styles not balanced in position and unequal in size.) (Porto Rico.) *stenophrys*, new species.
- Interspace between eyes at least as great as occipital depth of eye. 15.
15. Pronotum longer, less transverse, more ovate in outline. Median production of male subgenital plate with lateral margins subparallel, distal margin sharply oblique truncate, the sinistral angle very acute; sinistral style slightly more distal in position than dextral one. (Porto Rico.) *plagia*, new species.
- Pronotum shorter, more transverse, more elliptico-trapezoid in outline. Median production of male subgenital plate with lateral margins not parallel, distal margin obliquely arcuate, greatest length of production sinistrad; sinistral style markedly more distal in position than dextral one. (Virgin Islands and northern Lesser Antilles.) *antiguensis* Saussure and Zehntner.

16. Distal section of subgenital plate of male with lateral flaps folded mesad, leaving ventro-mesad a transverse subtruncate production, which is not appreciably infolded; within the orifice formed by the three parts may be seen the highly modified and very dissimilar styles, the sinistral being spiniform. Lateral angles of pronotum less evident, more rounded. (Jamaica.)

insularis (Walker).

Distal section of subgenital plate of male strongly gathered and puckered in three distinct, converging folds, meso-distad the plate is roughly arcuate-emarginate, the flaps laterad of this unsymmetrical and not strongly infolded mesad; styles less highly modified and not markedly dissimilar, basically as in the other species of genus. Lateral angle of pronotum more evident, less rounded. (Jamaica.) *landalei*, new species.

17. Size smaller (length of tegmen, 9.2-9.9 mm.). Subgenital plate of male symmetrically developed, with a low disto-median production, venter of plate not strongly sculptured; styles equal in development and size. (Jamaica.)

cuprea Hebard.

Size larger (length of tegmen, 11-11.2 mm.). Subgenital plate of male unsymmetrically developed, with a median U-shaped emargination separating two unequally-sized style-bearing productions, the sinistral far larger than the dextral, venter of plate markedly concave laterad and mesad; styles unequal in development and size. (Jamaica.) *orestera*, new species.

(The Lesser Antillean *C. punctipennis* Hebard is a member of the *Cuprea* Group, but the male sex is unknown and it is therefore impossible for us to include it in the above key. The dotted tegmina, however, are a distinctive feature not closely approached in any other species of the genus known to us. We have discussed the species in its proper systematic position below.)

The pronotal disk pattern fluctuates in tone and complexity in most of the species in response to the intensification or recession of the pattern as a whole. This affects many of the elements in the disk pattern which may be referred to as unstable, as in the recessive condition they become nearly if not fully obsolete, while the more stable features are merely weakened. In consequence the extreme conditions in material of the same species often will, at first examination, appear quite distinct, but a comparative analysis and homologizing of the features will show the basically essential character of the pattern.

The facial pattern acts in much the same fashion, the more ventral bars even becoming completely obsolete at times, again merely breaking into two or more components. Frequently the bars of an intensive phase break into a series of dots in recessive material of the same species, while in other species what might be called a mean or average color phase, with distinct and complete bars, shows in an intensive phase additional dark-colored infuscations which will unite and obscure bars of the pattern generally distinct.

The fluctuations in facial patterns noted above are not peculiar to the genus *Caribblatta*, as the same tendencies are found in many genera of the Pseudomopinae possessing complicated facial patterns. It seems advisable, however, to emphasize these tendencies in relation to a genus where they are particularly pronounced.

The group importance given to features of the pronotal pattern in the above key may seem unwarranted at first examination, or even be discounted by our remarks on pattern fluctuation. The facts of the case, however, are that the basic essentials of this pattern, the portions which are virtually unaffected by the pattern recession, are the determiners of the types of pattern used as group features. Only in the cases of the *Delicatula* Group and the *Insularis* Group will sufficient similarity be found to cause any confusion. The difference in pronotal pattern in these two is subtle, but the general tendencies which we have endeavored to express, i. e., a more circular and concentric disposition of spots, with fewer lines, in the *Delicatula* Group, and a more longitudinal disposition of the pattern with more lineate tendencies, and a distinct supra-cervical extension of the pattern in the *Insularis* Group, should be apparent after careful examination.

***Caribblatta reticulosa* (Walker)**

Blatta reticulosa WALKER, 1868, 'Catal. Blatt. Brit. Mus.,' p. 103. ♂; Jamaica.

JAMAICA.—Liguanea Plain, near Kingston, VII, 5, 1920, (R. and H.; moderately numerous in leaf litter in mangrove swamp), 3 ♂, 6 ♀, 1 immat. ♂, [Hebard Cln. and A. N. S. P.]. Cinchona ["Hill Gardens"]. Blue Mountains, VI, 11 and 14, 1923, (C. C. Gowdey and Mrs. C. C. Gowdey), 2 ♀, [Jam. Dept. of Agr.]. Near Troy, Trelawny Parish, V, 15, 1909, (A. E. Wight), 1 ♂, [M. C. Z.]. Balaclava, St. Elizabeth Parish, V, 1, 1909, (A. E. Wight; in decaying herbage), 3 ♂, 2 ♀, [M. C. Z.].

Uvarov has compared material from us with the Walkerian type, and finds our association to be correct.

This beautiful species is known only from Jamaica and Porto Rico. Hebard in his study of the genus¹ reported it from Stony Hill, St. Andrew Parish, Jamaica, and Aibonito, Dept. of Guayama, Porto Rico. The Cinchona individuals have slightly shorter tegmina than any other specimens seen by us, which reduction may possibly be correlated with the relatively elevated station (4900 feet) for this material. There exists, however, a probability the species is a native of the lower levels of the island and that it may have been accidentally introduced at Cinchona.

¹1916, Trans. Amer. Ent. Soc., XLII, p. 158.

The field work of the senior author in 1923 in territory adjacent to Cinchona, and in a variety of conditions, failed to disclose the present species, although three peculiarly montane species of the genus were encountered. This would seem to indicate that the Cinchona occurrence of *reticulosa* may be due to human agencies.

The facial pattern, aside from the interocular bar, varies in reduction of transverse elements, to the point where it is represented solely by paired groups of three trigonal spots near the antennal scrobes.

At Stony Hill *reticulosa* was taken in late October in leaves on humus in hillside forest.

Cariblatta nebulicola,¹ new species

Plate I, Figure 1

Related to *C. reticulosa* Walker, the color pattern being essentially the same, but *nebulicola* is decidedly larger, the bulk being half again as great, the new form also differing in the median portion of the male subgenital plate being produced into a thickened rounded labiation.

TYPE.—Male; Morces Gap, Blue Mountains, Jamaica. Elevation, 4980 feet. July 30, 1923. (Rehn; in dead leaf litter along trail side in dense windward slope forest.) [Academy of Natural Sciences of Philadelphia, Type No. 5400.]

Size large for genus; form and surface as in *C. reticulosa*. Interspace between eyes at occiput of moderate width, very slightly greater than occipital depth of eye. Palpi more elongate and slender than in *C. reticulosa*, penultimate and antepenultimate joints distinctly more delicate than in the older species. Tegmina slightly more elongate than in *reticulosa*, venation as in *C. reticulosa*.² Supra-anal plate moderately transverse, subtrigonal, median portion with margin subtruncate. Subgenital plate transverse, lateral portions of plate moderately upturned; stylar fossæ moderately deep, concave emarginations of distal margin, between which median portion of margin is produced into a rounded, thickened labiate and lappet-like projection, faintly asymmetrical, extent of production beyond fossæ equal to one-third distance between centers of same: styles short, swollen, not reaching as far distad as apex of median projection, distal surface covered with numerous short, almost imbricate teeth.

ALLOTYPE.—Female; same data as type. [Acad. of Nat. Sci. Phila.]

Differing from the male in the following noteworthy features.

Interspace between eyes at occiput greater, appreciably surpassing in width the occipital depth of eye. Supra-anal and subgenital plates as in same sex of *reticulosa*.

COLORATION.—Color pattern and tones essentially as in *C. reticulosa*³ with the few exceptions here noted. Dark paired bars of pronotal disk usually not connected meso-caudad, the bars varying somewhat individually in width. Tegmina with anal and discoidal fields suffused with tawny-olive,⁴ the normally covered portion of the

¹An inhabitant of fog or mist, in allusion to its occurrence at a locality which is rarely free from fog masses.

²See Hebard, 1916, Trans. Amer. Entom. Soc., XLII, p. 157.

³See Hebard, 1916, Trans. Amer. Entom. Soc., XLII, p. 158.

⁴This area in *reticulosa* was described by Hebard (idem, p. 158) as "suffused with mummy brown," but this is an error, as the color is tawny-olive.

dextral tegmen broadly washed with mummy brown; anal sulcus occasionally marked in part with mummy brown; mummy brown humeral band usually as extensive as in *reticulosa*, rarely (in type) not reaching as far distad as the apex of the anal field.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Width of Tegmen
♂, Morces Gap, Jamaica, type.....	9.2	2.3	3	11.4	3 mm.
♀, Morces Gap, Jamaica, allotype....	9.7	2.4	3.2	10.8	3
♀, Morces Gap, Jamaica, paratype...	9	2.2	3.1	10.7	3

The measurements show that but little size variation is present in the series of six adults before us. The color pattern varies but little, this in the extension of the darker markings, particularly the pronotal humeral stripe and the suffusion of the ventral abdominal surface.

The series before us consists of the type, the allotype, four paratypic females bearing the same data, and an immature male taken at the same locality, July 19, 1923, by Rehn and now in the Academy of Natural Sciences of Philadelphia. The adults were all taken from dead leaves banked along the side of the trail in dense forest of tree ferns, *Podocarpus*, *Cyrtilla*, and numerous other trees. The immature male was taken from an epiphytic bromeliad. This forest area is bathed in fog a large portion of the time and is quite different in character from that on the leeward side of the Blue Mountains.¹

***Caribblatta craticula* Hebard**

Caribblatta craticula HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, pp. 152, 156, 163, Pl. XI, figs. 4 and 5, Pl. XII, fig. 9. ♂, ♀; *Mayaguez (type locality) and Adjuntas, Porto Rico.

We have no information additional to that contained in the original description.

Craticula clearly represents one extreme of a series of species embracing forms from all the Greater Antilles and the Bahamas, which we are calling the *Delicatula* Group.

¹Shreve (Publ. No. 199, Carneg. Inst. of Washington) has studied this region from the standpoint of the plant geographer. The exact locality for the material of *C. nebulicola* is shown in plate six of his interesting contribution.

The peculiarly compressed rostrate median section of the male subgenital plate is the most apparent distinguishing feature of this species. This has been well figured by Hebard.

The species is known only from the western coast and Cordillera Central of Porto Rico.

***Caribblatta picturata*, new species**

Plate I, Figures 2 to 5

Caribblatta punctulata HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, p. 158. (In part.) Records from Adjuntas (in part) and Baños de Coamo, Porto Rico.

A member of the *Delicatula* Group, related on one hand to *C. craticula* of the same island (Porto Rico) and on the other to the Hispaniolan *C. unguiculata*. From *craticula*, *picturata* can be distinguished by the less compressed and less rostrate medio-distal section of the male subgenital plate, which has a central trigonal projection well separated from the infra-stylar sections of the plate, the whole lacking the substrangulate condition of the median peg-like protuberance and stylar contiguity of *craticula*. The face lacks the regular transverse dark bars of *craticula*, having instead a rather sparse pattern of dots, mainly grouped laterad. The pronotal pattern is more decided, regular and with more components than in the older known species. *Unguiculata* is compared with the present species below.

TYPE.—Male; Adjuntas, Department of Aguadilla, Porto Rico. June 8-13, 1915. (F. E. Lutz; beating.) [New York Academy of Sciences; American Museum of Natural History.]

Size, form, and texture of surface as usual in species of this genus.

Head narrowly visible cephalad of pronotum as seen from dorsum. Interspace between eyes faintly greater than occipital depth of eye.

Tegmina surpassing apex of abdomen by one and one-half times the length of pronotum.

Subgenital plate weakly scoop-shaped, with disto-lateral margins obliquely converging to the regions of the stylar bases, where the margin has subrectangulate projections, the surface of the plate there arcuately subinflated; median process of plate separated from the infra-stylar areas by moderately acute, rather narrow emarginations; median process acute, sublinguiform, apex sharp, lateral margins of the process with a weak sinuation. Styles short, with external and dorsal surface having a regular series of recurved unguiform spines, increasing in size distad, the terminal dorso-mesad one distinctly larger than the others, but not of exceptional size.

ALLOTYPE.—Female; Baños de Coamo, Department of Ponce, Porto Rico. December 27, 1914. (H. E. Crampton; at light.) [New York Academy of Sciences; American Museum of Natural History.]

Differs from the male sex, other than in purely sexual features, in the interspace between eyes being appreciably greater than occipital depth of eye.

General coloration similar to that of most of the other species of the genus. Interocular portion of the occiput with a broad, solid, transverse bar of prout's brown, below which the face is of the same ochraceous-buff as the whole venter, except for the following pattern of prout's brown: a concave transverse series of four dots between the upper margins of the antennal scrobes, the lateral ones connected ventrad

with an irregular larger marking; a pair of irregular, oblique infra-antennal bars, each connected mesad with a weak trigonal blotch, these faintly connected by an obscure line across the lower face; an isolated subobsolete U-shaped marking is indicated mesad, below the transverse series of dots and the faint line of the lower face. Occasionally (in paratype female) this marking develops lateral extensions and becomes connected with the lateral ones of the above-mentioned transverse series of dots. Eyes hazel. Pronotum with disk having the base color ochraceous-buff; dark pattern marked, prout's brown, made up of dots and lines, with the usual meso-caudal groups of five dots well indicated, the median pair of arcuate lines equally prominent, no markings reaching cephalic margin of the pronotum, or in fact extending beyond the area of the disk strictly speaking; latero-cephalic sections of disk pattern consisting of obliquely and sinuously disposed dots, lines and ocelli as figured (Pl. I, fig. 2). Venter of the abdomen with a broad median bar of prout's brown, narrowing distad, not involving the subgenital plate; laterad the same segments each bear a single circular dot of the same color; intimations of narrow lateral intermarginal dark bars are also seen.

MEASUREMENTS

	Length of Body	Length of Pronotum	Width of Pronotum	Length of Tegmen	Width of Tegmen
♂, Aibonito, Porto Rico, type.....	7.1	1.6	2.4	8	2.4 mm.
♂, Baños de Coamo, Porto Rico, paratype.	8.3	1.5	2.3	7.2	2.2
♀, Baños de Coamo, Porto Rico, allotype..	7	1.6	2.5	8	2.2
♀, Baños de Coamo, Porto Rico, paratype.	7.8	1.7	2.5	7.5	2.3

In addition to the type and allotype we have before us a paratype male and a paratype female, from the same locality as the allotype (Baños de Coamo), one taken the same date, the other in September, 1915. The specimens show no noteworthy features of difference.

The species may be limited in distribution to the more elevated central portions of the island of Porto Rico.

***Cariblatta unguiculata*, new species**

Plate I, Figure 6

Cariblatta punctulata HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, p. 158. (In part.) Portion of series from San Francisco Mountains, Dominican Republic.¹

Identical in general form, character and coloration with *C. picturata* except for the highly specialized character of the styles of the male subgenital plate, and some details of the facial and abdominal pattern, which latter, however, additional material may show not to be diagnostic.

¹The specimen on which this species is based is the one mentioned by Hebard (Trans. Amer. Entom. Soc., XLII, p. 160) in his footnote fifteen.

TYPE.—Male; San Francisco Mountains,¹ Province of Santo Domingo, Dominican Republic, Hispaniola. September, 1905. (August Busck.) [United States National Museum.]

Size, form and coloration as in *C. picturata*. Subgenital plate except for styles identical with that of *picturata*. Styles basally as in *picturata*, but terminal recurved unguiform spines enormously enlarged, very heavy, strongly recurved and directed mesad, forming half a circle and with their peripheral surface bearing several dentate serrations. The general form of the styles is so changed from that found in *picturata* that the impression of the first turn of a corkscrew is given.

The face bears a transverse narrow prout's brown bar between the dorsal sections of the antennal scrobes, which, however, are not involved; an obliquely directed spot of similar color adjacent to the internal margin of the scrobes; lateral infra-antennal larger blotches of the same, and a concave transverse lineation ventrad on the face, this with coalesced paired triangular blotches extending ventro-laterad to the base of the mandibles. The venter of the abdomen has a broad medio-longitudinal mummy brown bar and less clearly defined dark lateral bars, which latter are broken by a creamy white dot on each segment as well as a similar marginal edging; the dark areas reach but do not heavily involve the subgenital plate.

Length of body, 7.2 mm.; length of pronotum, 1.7; greatest width of pronotum, 2.4; length of tegmen, 8.2; greatest width of tegmen, 2.5.

The type of this extraordinarily specialized species is unique. Of the numerous specimens from this locality we find but one male with this remarkable styler development, and it is not possible to associate any of the females from the San Francisco Mountains with it by color or other ambisexual features. The species may be restricted to the region of the Dominican "Cordillera Central," but its fundamentally close relationship with *C. picturata* of the similarly elevated central portion of Porto Rico is clearly evident, and their common origin cannot be questioned.

Cariblatta glochis,² new species

Plate I, Figure 7

Related to *C. picturata* and *unguiculata*, here described, but differing chiefly in the more produced, truncate character of the median process of the male subgenital plate, on each side of which the margin is more broadly and deeply arcuate-emarginate.

The relationship with *C. delicatula* and its allies (*C. leucops* and *lutea*) is even closer, but the form of the subgenital plate of the male is sufficiently different to identify the present species, which also lacks a medio-longitudinal dark line on the venter of the abdomen.

TYPE.—Male; Mangrove Cay, Andros Island, Bahamas, May-June, 1917. (William M. Mann.) [American Museum of Natural History.]

The characters here given are those of appreciable difference from the descriptions of *C. picturata* and *C. unguiculata*.

¹For notes on this locality see page 11, footnote 1.

²From γλῶχis, the end of the yoke-strap, in allusion to the shape of the median section of the subgenital plate of the male.

Size somewhat smaller; form similar. Interspace between eyes of medium width, slightly greater than in *C. picturata*, appreciably exceeding the occipital depth of eye. Subgenital plate with medio-distal projection subquadrate, distal margin subtruncate, lateral margining diastemas between the projection and the styles relatively broad, regularly concave; infra-stylar portions of the plate obtusely produced, not prominent; styles much as in *picturata* but claw-like spines distinctly larger.

Color pattern as in *C. picturata*, but face ventrad of the occipital interocular bar uniformly pale buffy without dark markings of any sort. Venter of abdomen pale buffy, laterad with weak and cloudy longitudinal intermarginal bars of prout's brown, which are largely but a suffusion, although deeply colored on the circular areas of usual indication.

Length of body, 6.5 mm.; length of pronotum, 1.5; greatest width of pronotum, 2.2; length of tegmen, 7.1; greatest width of tegmen, 2.

The type of this species is unique. The exact systematic position of the species is rather difficult to determine. On one hand it has marked affinity with *picturata* and *unguiculata*, on the other with *delicatula*, *leucops*, *lutea* and related species. It would seem the more warranted course to consider it an off-shoot of the *delicatula* complex showing, however, pronounced tendencies toward the assemblage comprising *picturata* and *unguiculata*.

Caribblatta leucops,¹ new species

Plate I, Figure 8

While having in its genital features a decided suggestion of *C. craticula*, the present species is a close relative of *C. glochis* on one hand and *delicatula* on the other, having a generally similar coloration and fundamentally the same type of male subgenital plate. The resemblance of this plate to that of *C. craticula* we consider one of analogy, and not expressive of close relationship. From *glochis*, *leucops* may be separated by the larger size, somewhat narrower interocular space, and the less produced, narrower median projection of the male subgenital plate, which also has much smaller marginal concavities and smaller styles. From *delicatula* the present species differs markedly in the more compressed subgenital plate of the male, with its quite different median process and far narrower emarginations laterad of the same, as well as the narrower eye interspace.

TYPE.—Male; Port-au-Prince, Haiti, Hispaniola. 1910. (G. Lion.) [Hebard Collection, Type No. 959.]

Size medium (for genus); form as usual.

Interspace between eyes moderately broad, subequal to occipital depth of eye. Pronotal form, tegminal type and proportions as usual in the genus.

Subgenital plate weakly scoop-shaped; median process of distal margin small, rounded styliform, slightly narrowing distad, well rounded at apex; margining concavities flanking the median section narrow, moderately deep, the infra-stylar portions of the plate reaching distad as far as the apex of the median process, in

¹In allusion to the whitish, unmarked face.

general rectangulate, distal margin of these sections weakly arcuate, surface of the infra-stylar sections arcuate in transverse section: styles short, with recurved, claw-like spines short, directed mesad, closely adpressed, the terminal one distinctly heavier and longer than the others.

ALLOTYPE.—Female; same data as type. [Hebard Collection.]

Agreeing with the male in all ambisexual features, the only noteworthy structural feature being that the interspace between the eyes is broader than in the male, and slightly greater than occipital depth of eye. Genitalia showing no distinctive features.

Interocular dark bar broad, solid, prout's brown, sharply defined ventro-cephalad; face uniformly pale ochraceous-buff, rarely (in the type male) with a poorly defined dark pattern consisting of a pair of contiguous triangular markings, situated inter-antennally, and two indefinite transverse dark bands situated ventrad on the face.¹ Eyes mars brown. Pronotal pattern strongly marked, regular, of the type usual in this group of the genus. Venter of the abdomen pale with longitudinal marginal bars and a narrower median dark bar, all of these reaching to but not involving the subgenital plate. In the type these bars are broader than in the others, the lateral ones solid and single, while in the other specimens the median bar is narrower and the lateral ones break longitudinally into two parallel series separated by a pale interspace. Cerci largely suffused with mummy brown, the venter almost solidly so, the dorsal surface with a proximal and a predistal wash of the dark color.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Port-au-Prince, type	7	1.7	2	7.4	2.1 mm.
♂, La Moriniere, paratype.....	6.8	1.7	2.7	8.2	2.2
♀, Port-au-Prince, allotype.....	7.5	1.7	2.7	7.9	2.3

In addition to the type and allotype we have before us a single male paratype from La Moriniere, Haiti, elevation about 125 feet, taken March 1 to 5, 1922, (F. E. Watson), and from the collection of The American Museum of Natural History.

Cariblatta delicatula (Guérin)

Blatta punctulata BEAUVOIS, 1805, 'Ins. Rec. Afr. et Amér.,' p. 184, Pl. 1b, fig. 8. San Domingo. (Not *Blatta punctulata* Gmelin, 1790.³)

Blatta (Phyllodromia) delicatula GUÉRIN, 1857, in La Sagra, 'Hist. Phys. Polit. et Nat. Île de Cuba, Ins.,' p. 346. Cuba.

¹The possession of this pattern is a feature which is rather mystifying, as it is not at all indicated in the allotype or the paratype male. The pale portions of the face in the type are just as strikingly contrasted as in the other material of the species.

²One side of pronotal margin is broken, so the width cannot be accurately measured.

³1790, 'Syst. Nat.,' I, part 4, p. 2047. See Hopkinson, 1907, Proc. Zool. Soc. London, pp. 1035-1037, for dates of Gmelin's work.

Caribblatta punctulata HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, p. 158. (In part.) Records from Nassau, Bahamas; Cabañas in Pinar del Rio, Pinar del Rio, Cabana in Havana Province, Jesús del Monte, and Cayamas, Cuba; Little Cayman Island; San Lorenzo (in part), San Francisco Mountains (in part) and Sanchez, Dominican Republic, Hispaniola; Montego Bay (in part) and Rio Cobre, Jamaica.

It is most unfortunate to be compelled to discard Beauvois' earlier *punctulata* for the much later *delicatula* Guérin, but it is unavoidable on account of the preoccupation by Gmelin's name.

Hebard already has discussed¹ the variations of this rather widely distributed and plastic species. Unfortunately he was misled by the wide range of variation actually present in the species and included, with material properly belonging to this form, other individuals representing quite distinct and undescribed species. We have very carefully and fully re-examined the whole situation, with the material examined in 1916 and much additional before us.

Summarizing the localities previously reported by Hebard and adding the data for the additional material, we have examined the following (giving full data only for additional material).

BAHAMAS.—"Bahama Islands," II, 11, 1905, 1♂, 1♀, [Hebard Cln. and U. S. N. M.]. Andros Island, 1920, (W. M. Mann), 1♂, 1♀, [U. S. N. M.]. Fresh Creek, Andros Island, V-VI, 1917, (W. M. Mann), 1♀. Mangrove Cay, Andros Island, V-VI, 1917, (W. M. Mann), 1♀. Nassau, New Providence Island.

CUBA.—Pinar del Rio, Pinar del Rio Province. Baños de San Vincente, seven kilometers north of Viñales, Pinar del Rio Province, IX, 16-22, 1913, (Leng; on banana), 1 immature ♀. Cabañas, Pinar del Rio Province. Jesús del Monte, Havana Province. Cabana, Havana, Havana Province. Comoa, Havana Province, X, 1918, (J. Cabrera), 1♀, [A. N. S. P.]. Soledad, ten miles west of Cienfuegos, Santa Clara Province, VI, 5, 1918, (Barnum Brown), 1♂, 1♀. Cayamas, Oriente Province.

JAMAICA.—Montego Bay, St. James Parish. Balaclava, St. Elizabeth Parish, III, 23-IV, 15, 1909, (A. E. Wight), 1♂, 1♀, [M. C. Z.]. Rio Cobre, near Bogwalk, St. Catherine Parish.

HISPANIOLA.—Sanchez, Province of Samaná, Dominican Republic. San Lorenzo, Province of Samaná, Dominican Republic.² San Francisco Mountains, thirteen kilometers north of San Cristobal, Province of Santo

¹1916, Trans. Amer. Entom. Soc., XLII, pp. 158-163, Pl. xi, figs. 2 and 3, xii, figs. 4-8, xiii, figs. 1 and 2.

²The locality refers to a settlement on the San Lorenzo River, which empties in San Lorenzo Bay on the south shore of Samaná Bay, southeast of and across that body of water from the port of Sanchez.

Domingo. Blanton Mine, north of San Cristobal, Dominican Republic, VII, 26, 1917, (Harold Morrison), 4♂, [U. S. N. M. and A. N. S. P.].

LITTLE CAYMAN ISLAND.—No more exact locality.

We have tabulated and by carefully made sketches analyzed the extent of variation present in this species. It is clearly the most variable in the genus, and an appreciation of its variations suggests a possible explanation of the lines along which these variations have developed.

The subgenital plate of the male sex is, in this genus, probably the most important specific differential feature. In the other species of the genus the form of this plate has quite fixed and definite values, but in the present one very marked variation occurs in the shape and production of the median portion of the distal margin of the plate. The series before us is sufficiently extensive to enable us to feel confident of the specific identity of the extremes of form of this area, in material here considered as conspecific. In one extreme the interstyler portion of the distal margin of the plate is straight, or even very faintly concave, from which type it becomes increasingly convex-arcuate, until it is quite strongly so. From this type we find two tendencies evident: one, exemplified by a triangular (virtually equilateral) modification of the production, which is rare (Jesús del Monte, Cuba, one male only); the other a quadration of the same area, usually only by truncation of the most produced portion of the plate and thus the form is transversely rectangulate, or by a narrowing of the production as well as its distal truncation, the result being approximately subequal length and width. The latter condition has a marked suggestion of that found in *C. glochis*, and also occurs in the same general region as the latter species (Bahamas), but fundamentally the two appear to us to be well and specifically distinct, although the evolutionary development of *glochis* may be indicated by this tendency. Occasionally the tendency toward quadration is not fully symmetrical (one male from Montego Bay, Jamaica). We have before us sufficient connected and transitional evidence to fully convince us of the specific identity of these types, the extremes of which would appear distinct if alone compared.

Taking the variational evidence of the form of the distal margin of the male subgenital plate and geographically considering it, we find what might be called the more generalized type; i. e., that from a straight margin to one with a moderate arcuation,¹ found in Hispaniola, to the exclusion of any other tendency. Eastern Cuba (Cayamas) has the similar arcuate type with the truncate type also appearing; western Cuba has well arcuate (Cabana, Havana) and the distinctly triangular

¹As figured by Hebard, 1916, Trans. Amer. Ent. Soc., XLII, Pl. xi, fig. 2.

(Jesús del Monte) types. The Bahamas have the truncate tendency indicated, one from Andros having the extreme equally long and broad phase mentioned above. Jamaica has diverse tendencies, and virtually all are seen from one locality (Montego Bay), ranging from a well arcuate form through an arcuato-subquadrate type to a pronouncedly transverse quadrate one.

It appears to us from the foregoing that Hispaniola was probably the distributional center of the species, which there would seem to have greatest stability in this structural feature, which is of such great specific differential importance in the other forms of the genus.

From the Hispaniolan center toward the periphery of the species distribution, at least on the west and northwest, the lines of distribution exhibit marked and progressive instability in the form of this plate, eastern Cuba closely approximating Hispaniolan material in this respect, while western Cuba has what might be called marked divergence. Eastern Cuba has one variant which suggests quadrate condition best indicated in Jamaica, where we find arcuate and marked quadration occurring in the most confusing medley. The Bahamas have the quadrate tendency alone indicated and in a variable degree.

The interocular width is moderately variable, even in series from the same localities, but not to the extent of causing confusion with the other species characterized by extreme reduction of this interspace.

The color pattern has marked intensive and recessive extremes, in the latter of which the face bears no dark markings, while the pattern of the pronotal disk is very greatly reduced and consists at most of but a relatively few scattered dots.¹ In the intensive extreme the face bears a very complicated dark pattern, made up of generally transverse markings, the dorsal pair of which form large irregularly shaped blotches. Occasionally the transverse character of the facial pattern is obscured and we have two longitudinal series of dots, which, however, show evidence of their underlying transverse factor by the regularity of the paired transverse position, the longitudinal disposition usually to some degree arcuate. The intensive pronotal pattern represents about the maximum development of this found in the present group, and has been well figured by Hebard from a Hispaniolan male.²

Geographically the Hispaniolan material is in general distinctly intensive and none before us from the island are recessive in pattern. This is particularly true of the pronotal pattern.

¹See Hebard, 1916, Trans. Amer. Ent. Soc., XLII, Pl. XII, fig. 7.

²1916, *vide supra*, Pl. XII, fig. 6.

Cuban material ranges in pattern tone from one extreme (recessive)¹ to a moderately intensive type, while the few Bahaman individuals show an equally wide variational range. Montego Bay, Jamaica specimens show a wide range of variation in depth of pronotal pattern, but the face rarely has any dark markings.

It would seem that facial markings and a marked dark pronotal pattern are not always correlated, also that geographically little correlation of the intensity of the pronotal pattern is possible, and the same is almost as true of the facial markings.

The species occurs on at least the Dominican portion of the island of Hispaniola, probably all of Jamaica, eastern and western Cuba and at least certain of the western Bahamas (Andros and New Providence). It will probably be found more widely distributed on the Bahamas and also in other parts of Hispaniola. It does not occur in Porto Rico, as far as we know, the previous records from that island referring to other species and here corrected. Its occurrence on Little Cayman Island may be due to introduction from Jamaica.

***Cariblatta lutea minima* Hebard**

Cariblatta lutea minima HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, p. 170, Pl. XIII, fig. 4. ♂, ♀; Punta Gorda, Fort Myers, Citrus Center, South Bay of Lake Okeechobee, Marco, Everglade, Chokoloskee, Miami (type locality), Virginia Key, Homestead, Key Largo, Long Key and Key West, Florida.

CUBA.—Baños de San Vicente, Pinar del Rio Province. Cojimar, Havana Province, VIII, 21, 1918, (J. Cabrera; near sea-shore), 1♂, [A. N. S. P.].

Hebard² recorded the female specimen from Baños de San Vicente as *C. lutea lutea*, on account of its relatively long tegmina, but the wings in this specimen, as mentioned by him in footnote 27 on page 167 of the same paper, are greatly reduced and vestigial. The male before us from Cojimar is perfectly typical of *lutea minima* and demonstrates clearly the Baños de San Vicente female represents a long-tegmined individual of the same subspecies, and not the more fully winged *C. lutea lutea* of northern Florida and the adjacent regions.

This subspecies is known only from central and southern Florida and the two localities in Cuba here listed. Relative to the occurrence of this Floridian type in Cuba, see our remarks under *Latiblattella rehni* and *Plectoptera poeyi*, which are parallel cases.

¹As well figured by Hebard, 1916, *vide supra*, Pl. XII, fig. 7.

²1916, Trans. Amer. Ent. Soc., XLII, p. 170.

Cariblatia cuprea Hebard

Cariblatia cuprea HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, pp. 153, 156, 172, Pl. XI, figs. 6 and 7, Pl. XII, fig. 10. ♂, ♀; Stony Hill, Jamaica.

JAMAICA.—Long Pond,¹ Trelawny Parish, II, 20, 1921, (C. C. Gowdey), 1 ♂, [Jam. Dept. Agr.]. Cumberland District, Clarendon Parish, elev. about 3000 feet, XII, 15–18, 1919, (F. E. Watson), 1 immat. ♀. Port Antonio, Portland Parish, V, 16–26, 1906, (A. E. Wight), 2 ♀, [M. C. Z.]. Near Bog River, Port Antonio, Portland Parish, III, 31 and IV, 10, (A. E. Wight; night), 1 ♂, 1 ♀, [M. C. Z.].

An examination of the typical series from Stony Hill, as well as the material here reported, shows no appreciable variation in the pronotal pattern, although the face in two individuals is without the two ventral dark bars originally described. These specimens are both males, one from Stony Hill, the other being the Long Pond specimen reported above. These bars are also subobsolete in one male and two females from Stony Hill. A third interocellar bar is present in a male from the type locality, and is intimated in a female from the same place.

The interstyler portion of the margin of the male subgenital plate is generally as figured by Hebard,² although the Long Pond male shows that variation in the form of this area does occur, the arcuation there present being distinctly more marked than in the other males, and with a trigonal tendency.

This species is one very easily recognized by the combination of stouter form, reduced pronotal pattern, and general type of the male subgenital plate.

We have no information on the habits of the species to add to Hebard's original notes.

Cariblatia oresteria,³ new species

Plate I, Figures 9 to 11

A most interesting member of the *Cuprea* Group, showing clearly in its pronotal form and pattern its close relationship to *cuprea*, but in the structure of the male subgenital plate widely different, and there showing similarity to the South American *C. fossicauda* and *igarapensis* of the *Fossicauda* Group. The form of the male subgenital plate is so distinctive in the latter group that *oresteria* would at once be associated with *fossicauda* and *igarapensis*, if the pronotal form did not to our minds so definitely indicate the true relationship. In a linear arrangement it seems necessary to place the *Fossicauda* Group in the general vicinity of the *Cuprea* Group, as in *oresteria* we find evidence of similarity or parallelism in the development of the

¹A sugar estate on the north shore of the island about six miles from the sea. (C. C. Gowdey.)

²Vide supra, Pl. XI, fig. 6.

³From *ὄρεστέρα*, dwelling in the mountains, in allusion to its habitat.

genitalia, although true relationship may not actually exist. The relative weight to be given to the two sets of features, i.e., (1) pronotal form and basic pattern of same, and (2) general type and structure of the male subgenital plate, is a matter of personal equation, but with genitalic features as diverse as they are in this genus, and pronotal features basically as uniform within groups as they appear to be, it would seem more logical to stress the latter set of characters. Added force is given to this course of action by the fully warranted assumption that the endemic *Cuprea* Group has developed a specialized montane form, rather than that the South American *Fossicauda* Group has developed in Jamaica a form having a pronotal type similar to the peculiarly West Indian *Cuprea* Group. The species is probably in size the largest member of the genus.

TYPE.—Male; between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. Elevation, 4400 to 4700 feet. July 22, 1923. (Rehn; shaken from head of wild ginger (*Renalmia* sp.) in mountain forest.) [Academy of Natural Sciences of Philadelphia, Type No. 5407.]

Size large (for the genus); form relatively broad for the genus, much as in *C. cuprea*.

Head with occipital interspace between eyes distinctly broader (one-fourth in type) than occipital depth of eye. Palpi with their proportions somewhat different from those of *C. cuprea*, less slender; penultimate joint but very slightly longer than ultimate joint, instead of about two-fifths longer as in *cuprea*; ultimate joint appreciably broader and less compressed as seen from dorsum than in *C. cuprea*.

Pronotum with its general form as in *C. cuprea*.

Tegmina and wings surpassing apex of abdomen by about length of pronotum, general form and venation as in *C. cuprea*.

Subgenital plate moderately produced, subtrigonal, appreciably asymmetrical: sinistral side with margin oblique, in proximal two-thirds weakly convex, with highest section of arcuation somewhat flattened; dextral side with margin oblique, shorter than sinistral side, weakly convex proximad; medio-distal portion of margin conspicuously U-emarginate; sinistral stylar peduncle large, much exceeding in size and projection caudad the dextral stylar one, relatively broad; dextral stylar peduncle little extended and forming a broad receptacle for the style: surface of plate with marked and elevated, but rounded, ridges extending proximad from stylar peduncles, diverging, becoming subobsolete proximad, surface between and laterad of these ridges concave, more decidedly so on lateral sections: sinistral style but little apparent, largely hidden in pocket of dorsal surface of sinistral stylar peduncle, visible surface heavily spinulose; dextral style relatively large, short and broad, fully exposed when seen from venter, free margin transversely convex and supplied with mesad directed spines, except on internal face. Cerci elongate, subequal to greatest length of subgenital plate, tapering moniliform, apex very slender and acuminate.

ALLOTYPE.—Female; same locality as type. Elevation 4650 feet. July 24, 1923. (Rehn; from epiphytic bromeliads.) [Academy of Natural Sciences of Philadelphia.]

The following features are those of noteworthy difference from the male sex.

Occipital interspace between eyes very faintly broader than in male.

Subgenital plate moderately produced, in general form subtrigonal, narrowly scoop-shaped distad; lateral margins regularly converging, faintly arcuate proximad, very weakly and broadly concavo-emarginate in subcercal region, thence nearly

straight to the rather narrow and rounded apex, which has an almost imperceptible median concavity. Cerci faintly shorter than greatest length of subgenital plate.

General coloration ochraceous-buff, lateral portions of pronotum and marginal and greater portion of scapular field of tegmina clear hyaline. Head with interocular bar prout's brown, sharply defined ventrad, less so dorsad, ventral margin broadly obtuse-angulate: dark face pattern with as much as three transverse, rather narrow bars, one interocellar and straight, one between ventral margins of antennal scrobes and nearly straight, the third below this and arcuate; the first is indicated in all the material seen, the second is evident or indicated by dots in all, while the third is found in but a single specimen. Eyes mars brown to fuscous. Pronotal disk much as in *C. cuprea*, a pair of dark dots near the middle and with intimations of a fine dark pencilling outlining the disk, paired supra-cervical lines and a "ghost" pattern of curved lines, all of which are variable in intensity and emphasis. Tegmina with no dark markings. Venter of abdomen with pronounced dark markings in but a single individual (the intensive female showing a third dark facial bar), which has a solid, broad, medio-longitudinal mummy brown bar reaching to the base of the subgenital plate, and lateral cloudings of prout's brown, which involve a portion of the margin on each segment.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Type.....	10	2.5	3.5	11	3.1 mm.
♀, Allotype.....	10.3	2.5	3.6	11	3.2
♀, Paratype.....	11.7	2.7	3.7	11.2	3.3

In addition to the type and allotype we have before us three paratyptic females bearing the same data as the allotype. These show some variation in size, as witnessed by the measurements given above, and also some in coloration, the range of which is covered in the color description.

All the material of this species was taken in the higher forested country of the Blue Mountains of Jamaica, either shaken from the pale orange-yellow flowers of wild ginger (*Renealmia*) along one of the shaded trails, or taken from a group of epiphytic bromeliads growing on several trees at 4650 feet, near a trail and somewhat away from dense forest.

***Cariblatta punctipennis* Hebard**

Cariblatta punctipennis HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, pp. 156, 173, Pl. XII, figs. 11-18. ♀; Long Ditton and Laudet, Dominica; Barbados (type locality).

This imperfectly known species is clearly a close relative of *C. cuprea* and *C. orestera*, having the same general pronotal form and essentially the same pronotal pattern. Unfortunately the male sex is not known, but

the marked brownish punctulæ on the tegmina are distinctive features. The species is well removed from *C. cuprea*, but we have no information regarding its features to supplement that contained in the original description.

Probably this species is limited in distribution to the more southern of the Lesser Antilles and is the one examined by Brunner¹ when he recorded *delicatula* from Grenada and St. Vincent.

Cariblatta cryptobia,² new species

Plate I, Figures 12 to 14

Cariblatta punctulata HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, p. 158. (In part.) Stony Hill, St. Andrew Parish, Jamaica.

A member of the *Insularis* Group, and forming with *C. islacolonis* and *plagia*, here described, a subgroup having a distinct uniformity in general form and pronotal pattern, but differing in genital and other features. From the species of the preceding *Cuprea* Group, i.e., *cuprea*, *orestera* and *punctipennis*, all three species mentioned above differ in the more slender form, smaller and trapezoidal form of the pronotum, as well as its pattern, and more elongate and differently patterned tegmina with a narrower marginal field. The male subgenital plate of *cryptobia*, however, is very similar to that of *cuprea*, while this area is appreciably different from that of *islacolonis* and very markedly distinct from the type found in *C. plagia*. Comparisons with these species are given under their respective diagnoses. The affinity of these three species with *insularis* and its closer relatives is evidenced, however, by the peculiarities of the pronotal pattern shared by these species, as well as the tegminal pattern and elements of that of the face and interocular region.

TYPE.—Male; Stony Hill, St. Andrew Parish, Jamaica. October 25, 1913. (Morgan Hebard.) [Hebard Collection, Type No. 960.]

Size relatively small: form slender.

Interspace between eyes of medium width, subequal to occipital depth of eye.

Pronotum in outline subtrapezoidal, greatest width distinctly caudad of the middle; lateral margins distinctly oblique-arcuate from point of greatest width cephalad, regularly passing into cephalic margin, which is appreciably arcuate and in width no greater than one-third of greatest width of pronotum; caudal margin weakly arcuate; lateral sections of pronotum distinctly declivent.

Tegmina lanceolate, surpassing apex of abdomen by faintly more than length of pronotum, moderately subequal in width, apex narrowly rounded; marginal field narrow, distinctly narrower than in *C. cuprea*.

Subgenital plate with interstylar portion of margin weakly produced into a low, transversely subquadrate extension, which is reflexed dorsad and has its actual margin weakly convex arcuate; portion of distal margin dextrad of dextral style faintly arcuate, portion sinistrad of sinistral style obliquely subtruncate. Styles virtually as in *C. cuprea*.

ALLOTYPE.—Female; same data as type. [Hebard Collection.]

Differing from the description of the type in the following features.

¹1892, Proc. Zool. Soc. London, p. 202; 1893, idem, p. 602.

²From κρυπτός, hidden, βίος, life, i.e., a liver of the hidden life.

Form slightly more robust. Interspace between eyes equal to one and one-third times the occipital depth of eye. Tegmina surpassing apex of abdomen by about length of pronotum. Subgenital plate of type usual in genus, subcompressed distad, scoop-shaped; medio-distal section of margin narrowly subtruncate as seen from venter, laterad of this obliquely concave in infra-stylar regions, thence obliquely subtruncate.

General color ochraceous-buff, the pronotal pattern and head and tegminal markings prout's brown to mummy brown. Head of general color, with a broad, dark interocular bar, which has its ventral margin concave or obtuse-angulate emarginate: the face bears three groups of transverse dark markings; the first, which is interocular, straight or weakly arcuate, broken mesad into paired lateral sections; the second interantennal, weaker and occasionally broken and subnebulous, arcuate; the third distinctly ventral in position, weaker than the others, subnebulous, incomplete laterad and generally broken mesad, so that it is usually made up of two maculations, which are arcuate in disposition. Eyes chestnut-brown. Pronotal disk pattern of the type found in most of the species of this group, and the *Insularis* and *Fossicauda* Groups, consisting of elements similar to those found in the *Punctulata* Group, but more lineate and less punctate, with a pair of additional supra-cervical borderings which reach the cephalic margin of the pronotum (Plate I, fig. 13): lateral portion of pronotum largely clear hyaline. Tegmina with a dark pattern of two arcuate dashes, one on the proximal half of the anal sulcus, the other shorter and often weaker, placed on the discoidal vein at point of divergence of this vein and the median vein, rarely the latter marking is obsolete. This tegminal pattern is the same as that figured by Hebard for *insularis*,¹ while the pronotal pattern is basically as in the latter species.² Venter of abdomen with onemedian and broken lateral dark bars, reaching and joining on the subgenital plate, the lateral bars occasionally obsolete except for the dark stigmatic spots, but in the more intensively colored individuals the lateral bars are broad clouded areas, not sharply defined mesad and with enclosed pale dots on each side of the stigmatic spots, limited laterad by an oblique, sharply defining pale lateral edging on each segment. Limbs pale with dark ventral femoral lineations and vicinity of the tibial spines similarly infusate.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Stony Hill, Jamaica, type.....	6.7	1.6	2.4	8	2.3 mm.
♀, Stony Hill, Jamaica, allotype.....	8.2	1.7	2.7	8.2	2.3
♀, Stony Hill, Jamaica, paratype.....	7.4	1.7	2.6	8.2	2.3
♀, Stony Hill, Jamaica, paratype.....	8	1.7	2.6	8	2.3
♀, Mandeville, Jamaica, paratype.....	7.4	1.9	2.7	8.2	2.3

¹1916, Trans. Amer. Entom. Soc., XLII, Pl. XII, fig. 16.

²Idem, Pl. XII, fig. 15.

In addition to the type and allotype we have before us two paratypic females bearing the same data as the type and allotype, and a paratypic female from Mandeville, Manchester Parish, Jamaica, elevation about 2250 feet, November 26–28, 1919, (F. E. Watson; at light), from the collection of The American Museum of Natural History. The material shows that the species is quite uniform in size and the color variation is relatively little for species of this genus. Having but a single male we are unable to say whether any variation occurs in the male genitalia.

***Cariblatta islacolonis*,¹ new species**

Plate I, Figures 15 to 17

Cariblatta punctulata HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, p. 158. (In part.) In part series from San Francisco Mountains and San Lorenzo, Dominican Republic, Hispaniola.

This species is closely related to *C. cryptobia* from Jamaica, described above, agreeing in general form, size, shape of tegmina and pattern of pronotum and tegmina, but differing chiefly in the proportionately longer pronotum, in the ventral margin of the dark interocular bar having two angulate extensions, instead of being concave or angulate-emarginate as in *C. cryptobia*, and in the different structure of the male subgenital plate, which has the styles very characteristically inserted.

TYPE.—Male; San Lorenzo, Province of Samaná,² Dominican Republic, Hispaniola. June 27–29, 1915. (F. E. Watson.) [American Museum of Natural History.]

Differing from the description of *C. cryptobia* in the following features.

Interspace between eyes relatively broad, equal to one and one-fourth times the occipital depth of eye.

Pronotum with its breadth less in proportion to its length than in *C. cryptobia*, the greatest width but one and two-fifth times the greatest length, ovate-trapezoidal, point of greatest width but slightly caudad of middle: cephalic margin moderately arcuate, passing regularly into the arcuately obtuse-angulate lateral margins; caudal margin arcuate to the same degree as the cephalic margin, passing by narrowly rounded obtuse-angulations into the lateral margins.

Subgenital plate with its surface distad longitudinally biundulate, being elevated into arcuate folds laterad of a medio-distal depressed section: distal margin produced mesad into a roundly obtuse projection, laterad of which, and at the extremity of the arcuate folds, the margin is weakly concave, thence passing from the distal to the lateral margins by obtuse angulations. Styles inserted on each side of median production of distal margin of subgenital plate, disposed transversely and free extremities directed laterad, distal region and adjacent dorsal surface of styles covered with recurved spiniform teeth.

Coloration as in *C. cryptobia* except for the following. Head with interocular dark bar having its ventrad margin biangulate, dorsal margin irregular and with a pair of narrow extensions indicated mesad: face with dark pattern in general resembling that of *C. cryptobia*, but heavier, the interocellar bar heavier, its dorsal margin dentate, and connected laterad with the second bar, which is heavier laterad and

¹In allusion to the association of Columbus with the island of Hispaniola.

²See footnote 2, page 26.

crudely brace-shaped, the third laterad broadly marked ventrad of the antennal scrobes, thence arcuate across the face, heavy, narrowed mesad; lower border of face with several infusate dots. Pronotum disk pattern similar to that of *cryptobia*, but more finely marked (type) or some of the elements very weakly indicated (para-type).

Venter of abdomen pale, occasionally with very weak indications of a pair of darker median bars; laterad the only dark markings are the stigmatic spots.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, San Lorenzo, Dominican Republic, type.....	7.1	1.6	2.3	8	2.1 mm.
♂, San Francisco Mountains, Domini- can Republic, para- type.....	7.6	1.7	2.5	8.5	2.1

In addition to the type we have before us a single paratypic male from the San Francisco Mountains,¹ Dominican Republic, taken September, 1905, by A. Busck, and in the National Museum series.² No noteworthy differences exist between the two specimens.

Cariblatia plagia,³ new species

Plate I, Figures 18 to 20

Cariblatia punctulata HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, p. 158. (In part.) Manati and Rio Piedras, Porto Rico.

A near relative of *C. islacolonis*, agreeing with it in the pronotal form, as well as the color pattern of the pronotum and tegmina, but differing in the very striking features of the male subgenital plate, which include an obliquely subtruncate median production, and in the complicated and distinctive facial pattern, which also has no sharply defined interocular occipital bar, the markings of that area merging into the general facial design.

TYPE.—Male; Arecibo, Department of Arecibo, Porto Rico. December 22, 1921. (F. Sefn.) [Academy of Natural Sciences of Philadelphia, Type No. 5402.]

The following description is of features of difference from the above descriptions of *C. cryptobia* and *C. islacolonis*.

Interspace between eyes slightly greater than occipital depth of eye, broader than in *cryptobia*, narrower than in *islacolonis*.

¹See footnote 1, page 11.

²This is the individual described by Hebard (1916, Trans. Amer. Entom. Soc., XLII, p. 158), as the male sex of *C. punctulata* (= *delicatula*). His figures of that species, however, and the female described, represent true *delicatula*.

³From πλάγια, placed sideways, slanting, athwart, in allusion to the oblique truncation of median portion of the male subgenital plate.

Pronotum as in *C. islacolonis*, but lateral margins faintly more broadly arcuate point of greatest width faintly more caudad of middle of pronotum than in *C. islacolonis*.

Subgenital plate with lateral sections subvertical, the plate thus nearly scoop-shaped and the ventral surface with its lateral boundaries weakly conveying distad; median section of distal margin produced into a projection of subequal width, with straight, parallel sides and having its distal extremity strongly oblique truncate, the truncation faintly concave, the distal point sinistral in position and decidedly acute, a few fine serrulations present sinistrad on that margin of this production; laterad of median production the distal margin is weakly produced into low, broad, obtuse-angulate infra-stylar shoulders, the sinistral of which is distinctly larger and more evident than the dextral, surface of plate for short distance between median production and sinistral shoulder arcuately and longitudinally impressed: styles subequal in size, sinistral slightly the larger, both with dorsal surface armed with decurved unguiciform spines, these most numerous on the larger sinistral style.

General coloration as in *C. cryptobia* and *islaconis* except as follows: interocular region without any definite interocular bar, the occiput itself with paired lateral dark dots and a median pair of closely placed dashes, which sometimes partly fuse; from middle (longitudinal) line of eyes ventrad to and including interocular region the face is wholly dark, except for irregular pale juxtaocular margins and one or two pairs of enclosed pale dots, one pair being lacking in some specimens and occasionally the ventral pair is not complete and represents solely evaginations of the irregular ventral margin of this dark area; ventrad of this are two transverse arcuate series of dark dots about four in each series, those of the ventral series larger and occasionally fused into lateral bars, rarely the two median dots of the dorsal series are fused; ventro-lateral margins of face infuscate. Pronotal pattern as figured (Plate I, fig. 19), the supra-cervical markings occasionally subobsolete (in type). Tegmina occasionally without dark markings (type), generally with that on the anal sulcus alone developed, rarely (one Manati male) the discoidal streak is as well indicated.

Venter of abdomen infuscate trilineate as in *C. cryptobia*, but bars not joining on or quite reaching the subgenital plate, all variable in intensity and extent, occasionally broken into series of segmental dots, while the lateral series are always more distinctly and definitely indicated than the median one.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Arecibo, Porto Rico, type.....	7.5	1.7	2.2 ¹	7.8	2.1 mm.
♂, Rio Piedras, Porto Rico, paratype.....	7	1.6	2.3	7	2
♂, Manati, Porto Rico, paratype.....	7.3	1.8	2.5	7.9	2.2

¹Approximate, as one margin of pronotum is damaged.

In addition to the type we have before us four paratypic males, all from Porto Rico: one taken at Rio Piedras, Department of Humacao, December 18, 1911, (T. H. Jones), from the U. S. National Museum; three taken at Manati, Department of San Juan, June 27 to 29, 1915, (Lutz and Mutchler; at automobile headlights), from the American Museum and the Hebard Collections.¹

These specimens show some variation in the exact shape of the median production of the male subgenital plate, which has its oblique truncation subarcuate with the dextral obtuse-angulation less evident in several Manati males and that from Rio Piedras. Rarely the acute sinistral angle of the same production is attenuately developed until it is really spicate. In no case, however, is this variation of such character as to cause any doubt as to the true identity of males of this species. The variation found in the facial markings is of a relatively minor character,² while the pronotal marking shows intensive and recessive extremes, the latter virtually lacking supra-cervical markings, which are quite evident in all the material except the type. The pattern of the tegmina varies appreciably from the recessive condition of the type, which lacks all dark markings, and consequently pattern, to the opposite extreme, which has evident infuscation of the anal sulcus, most pronounced proximad and distad, and an evident spot on the discoidal vein in the same position as in *C. cryptobia* and *islacolonis*.

All the localities from which this species is known are in the northern coastal section of Porto Rico. Whether it is limited in distribution to this area remains to be determined.

***Cariblatia stenophrys*,³ new species**

Plates I, Figure 21; II, Figures 1 and 2

Cariblatia punctulata HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, p. 158. (In part.) Mayaguez and Adjuntas, Porto Rico.

This species possesses the pronotal pattern of the preceding members of the *Insularis* Group, and has a tegminal pattern basically similar to that of the same species. The diagnostic features of the present species are an exceptionally narrow interocular space, a heavily infusate and complicated facial and occipital pattern and a type of male subgenital plate somewhat suggesting that of the preceding species, *plagi*. The relationship to *C. plagi* is close, but the extreme narrowness of the interocular space, aside from the other features, is sufficient to distinguish the two species. The features of difference from the species of the group which follows the present one in a linear sequence are given in their diagnoses.

¹Hebard recorded all of these specimens as *C. punctulata* (1916, Trans. Amer. Entom. Soc., XLII, p. 163).

²The face of the type has been discolored in drying and our color notes of this area are drawn from the other specimens.

³From στενός, narrow, and δφρύς, brow, in allusion to the narrow interocular space.

TYPE.—Male; Mayaguez, Department of Mayaguez, Porto Rico. June 21–23, 1915. (Lutz and Mutchler; at light.) [New York Academy of Sciences; American Museum of Natural History.]

The characters here given for the species are those not shared with the preceding members of this group, and which have by themselves or in combination diagnostic value for *stenophrys*.

Size slightly larger than *C. plagia*, general form similar.

Head with eyes more prominent than usual in the group; occipital interocular space quite narrow, hardly more than two-fifths as great as occipital depth of eye.

Pronotum with outline and proportions as in *C. cryptobia*, except for caudal margin being faintly more flattened.

Tegmina surpassing apex of abdomen by distinctly more than pronotal length.

Subgenital plate showing some suggestion of that of *C. plagia* in its general type, but median production is narrower, has its distal extremity obliquely subarcuate, with both angles broadly rounded; infra-stylar shoulders developed much as in *C. plagia*: styles more equal in size, although sinistral is the larger.

ALLOTYPE.—Female; Adjuntas, Department of Aguadilla, Porto Rico. June 8–13, 1915. (F. E. Lutz; beating.) [New York Academy of Sciences; American Museum of Natural History.]

Differing from the features given for the male as follows: eyes less prominent than in male; occipital interocular space much greater, subequal to occipital depth of eye. Pronotum slightly less distinctly transverse than in male, length of same faintly greater in proportion to greatest width. Subgenital plate large, relatively broad; distal margin broadly arcuate between shallow infra-cercal emarginations, immediate apex very faintly obtuse-angulate.

General coloration as usual in the group, a dark pattern of russet to mummy brown on a light ochraceous-buff ground. The general details of the dark pattern are as follows: occiput with four longitudinal dark dashes, the median pair closely placed or contiguous and partially fused (male). From interocular region ventrad extends a complicated dark facial pattern, without a definite interocular bar except as a part of the whole, the exact form of which is best shown by our figure, but which is composed of a dorsal transverse blotch connected laterad with a more ventral transverse arcuate marking, which in the female is not as extensive and in the male is much more extensive than that dorsad of the same, a vertical marking bisects the more ventral maculation and may or may not fuse with the more dorsal transverse bar; in the male this vertical marking broadens ventrad and becomes involved with the median pair of an arcuate series of four dots; ventrad of this series of four dots is another similar one of larger dots and of more extent transversely. Eyes ranging from hays russet to chestnut-brown.

Pronotum with pattern well illustrated by the accompanying figure, the longitudinal elements and tendencies distinctly pronounced and the supra-cervical lines very evident. Tegmina with a proximal and a distal infuscation on the anal sulcus, with or without a connecting pencilled lineation along the sulcus, a similar infuscation on the discoidal vein as in the related species; covered portion of right tegmen occasionally (type) markedly infusate. Venter of abdomen with the usual median and inter-marginal lateral longitudinal dark bars; median much less evident and extensive than the laterals, never reaching more than the extreme base of the subgenital plate, while in the female sex the lateral bars reach to slightly caudad of the infra-cercal emarginations. Limbs marked with dark as in related species.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Mayaguez, Porto Rico, type.....	8.8	2	2.7	9	2.6 mm.
♀, Adjuntas, Porto Rico, allotype.....	9	2.1	2.8	9.8	2.6
♀, Mayaguez, Porto Rico, paratype.....	7.5	1.9	2.7	7	2.4

In addition to the type and allotype we have before us two paratype females, one taken with the allotype, bearing the same data and from the same collection, the other from Mayaguez, Porto Rico, taken January, 1899, by August Busck, and from the United States National Museum.¹ An immature specimen forming part of the Adjuntas series is also before us.

The Mayaguez female is appreciably depauperate, being distinctly smaller in size and with the tegmina surpassing the apex of the abdomen by less than the pronotal length.

The type is the most intensively colored of any of the specimens, the Mayaguez female the most recessively colored. The Adjuntas females are in general intermediate between the extremes.

The species is known only from the western portion of Porto Rico, extending from sea-level (Mayaguez) to a considerable elevation in the Cordillera Central (Adjuntas).

Cariblatta antiquensis (Saussure and Zehntner)

Plate II, Figures 3 and 4

Theganopteryx (Pseudectobia) antiquensis SAUSSURE AND ZEHTNER, 1893, 'Biol. Cent.-Amer., Orth.,' I, p. 17. (In part.) ♀; Antigua; Cuba.

VIRGIN ISLANDS.—No further locality, V, 3, 1922, (C. E. Wilson; in dead leaves), 1 ♂, [U. S. N. M.]. St. Croix, VI, 10, 1917, (Harold Morrison), 1 ♀, [U. S. N. M.].

ST. BARTHOLOMEW.—(Forsström), 1 ♀, [Hebard Collection].

Hebard² considered this name to represent a synonym of *insularis*, which is, however, as far as we know a peculiarly Jamaican insect. Examined anew in the light of present material, not available in 1916, it is evident that *antiquensis* as limited to the Antiguan portion of its original material is in all probability a member of the present group of species, quite distinct from *insularis*.

¹These specimens were recorded by Hebard (*vide supra*), along with the type and allotype, as *C. punctulata*.

²1916, Trans. Amer. Entom. Soc., XLII, p. 175.

The species before us, which we are considering *antiguensis* as it agrees fairly well with the inconclusive original description based solely on the female sex, is more closely related to *C. stenophrys* than to any other species known to us. The interspace between the eyes is distinctly broader than in *stenophrys*, while the facial pattern is very similar. The male genital features are more like those of *stenophrys* than any other species.

The noteworthy features of difference from *stenophrys*, as shown by the male sex, are as follows:

Head with occipital interspace between eyes subequal to occipital depth of eye. Subgenital plate of male as asymmetrical as in *stenophrys*, but median production broader and less produced, its distal margin similarly obliquely arcuate; infra-stylar shoulders very weak; styles much as in *C. stenophrys*.

Color pattern basically much as in *C. stenophrys*. Occiput with four dash-like maculations, the median pair closely placed. Dorsal blotch of facial marking much as in *stenophrys* but with paired enclosed pale blotches larger, circular and in position hardly dorsad of the ocelli, ventral margin of the dorsal blotch with its median production narrower, more subquadrate; two transverse arcuate series of dark dots, four in each, are present on the lower face, the more ventral occasionally (St. Bartholomew female) forming a continuous dark bar except for a narrow median break. Pronotal pattern much as in *stenophrys* but generally less strongly indicated and with fewer of the basic components evident. The St. Bartholomew female has the pronotal pattern as well indicated as in *stenophrys*. The usual tegminal markings of the group may be absent, the anal sulcus either having a distinct dark lining proximad or being virtually without dark marking, while there is no marking indicated on the discoidal vein. Venter of the abdomen with dark lateral intermarginal lines, these occasionally (in the single male) reduced to stigmatic spots, and in the St. Bartholomew female infuscating much of the entire lateral sections of the abdomen.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Virgin Islands.....	7.9	2	2.8	8.6	2.4 mm.
♀, St. Croix.....	7	2	2.9	7.9	2.5
♀, St. Bartholomew....	8.1	2.2	3.1	9.4	2.7

The Cuban material originally referred to *antiguensis* in all probability was incorrectly associated, and we feel Hebard was correct¹ in suggesting this probably represents *C. punctulata*, which is one of the two species of this genus known from Cuba.

¹1916, Trans. Amer. Entom Soc., XLII, p. 175.

The species, as we have interpreted it, is known only from the Virgin Islands (specifically solely St. Croix) and the northern Lesser Antilles (Antigua and St. Bartholomew).

***Cariblatta jamaicensis*, new species**

Plate II, Figures 5 to 8

Related to *C. stenophrys* from Porto Rico, described above, agreeing in general form and main features of the color pattern, but readily separated by the somewhat broader interocular space, which, however, is still distinctly narrower than in the majority of the species of the genus, in the different arrangement of the occipital and facial pattern, and in the very different male subgenital plate, which is of a type with no median projection, and in ventral aspect much suggesting that of the otherwise very different *C. reticulosa*. When viewed in caudal aspect, however, the male subgenital plate is seen to be most distinctively formed, with paired reflexed marginal lamellations unlike in any other species, but which structures have analogs in *C. insularis* and *landalei*. *Jamaicensis* is, apparently, a connecting link between *C. plagia* and *stenophrys* on one hand and *C. insularis* and *landalei* on the other.

TYPE.—Male; Balacava, St. Elizabeth Parish, Jamaica. May 1, 1909. (A. E. Wight; in decaying herbage.) [Museum of Comparative Zoölogy.]

Compared with *C. stenophrys* the present species shows the following noteworthy features.

Head with eyes as prominent as in *stenophrys*; occipital interocular space almost four-fifths as great as occipital depth of eye.

Pronotum of the same general outline and proportions as in *C. plagia*, less transverse and more trapezoidal than in *C. stenophrys*.

Tegmina as in related species.

Subgenital plate slightly transverse, bluntly scoop-shaped; lateral margins arcuately converging distad when seen in ventral aspect; distal margin, when seen from venter, broad, sinuato-truncate, having on each side in usual position of the infra-stylar shoulders in preceding related species, a low, broad, rounded elevation, becoming obsolete proximad and terminating at distal margin in obtusely rounded weak productions of same; portion of border between these productions very weakly arcuate when seen from venter; seen in caudal aspect distal section of subgenital plate is found to be developed into vertical lamellate extensions dorsad of lateral productions of distal margin, these lamellate extensions longer transversely than high, attached solidly to distal margin mesad, free and strongly incurved latero-cephalad, dorsal margin of extensions subtruncate, obliquely subtruncate mesad; styles not evident.

ALLOTYPE.—Female; same locality as type. April 15, 1909. (A. E. Wight.) [Museum of Comparative Zoölogy.]

Differing from the features given for the male as follows: eyes less prominent; occipital interocular space much wider, from equal to slightly greater than occipital depth of eye. Pronotum faintly less transverse than in male, the length slightly greater in proportion to greatest width. Subgenital plate essentially as in the same sex of *C. stenophrys*.

General coloration as usual in the group, the dark pattern, except for facial and other details here mentioned, essentially as in *C. stenophrys*, described above. Occi-

put with four longitudinal dark lines in type, the median two merged in the allotype, all fusing ventro-cephalad into a narrow transverse occipital bar, or occipital bar solid but caudad showing its respective components; the occipital bar has its ventral border, which is no lower than the middle of the occipital depth of the eyes, distinctly and sharply defined and separated from the facial pattern by a considerable extent of pale base color. Facial pattern consisting of two major elements: (a) the first is interantennal in position and consists of an extensive dark blotch, its dorsal margin reaching from the eyes narrowly across the dorsal section of the antennal scrobes, thence concavely emarginate on each side of a median dorsad projecting subquadrate extension; a median vertically disposed oval of the pale base color may (♀) or may not (♂) be completely enclosed in the dark area, in the latter case it appears as an invagination of the ventral margin of the dark area; ventral margin of this area broadly arcuate between antennal scrobes, narrowly emarginate beneath median oval pale area in the females seen; (b) ventral side of antennal scrobes bordered by dark areas, which are connected across the face by an irregularly arcuate dark bar, faintly interrupted mesad, and occasionally laterad. Eyes ranging from cinnamon-brown (male) to mummy brown (female). Pronotum with pattern as shown in the accompanying figure, essentially as in *C. stenophrys*. Tegmina of the male with no distal infuscation on the anal sulcus, in the female the usual dark markings are obsolete, possibly due to the effects of a preservative as the specimens at some time have been immersed in a solution. Venter of abdomen pale with intermarginal dark bars, broken and narrow to solid, broad and continuous in the male, not reaching the subgenital plate and on the more distal segments touched by them represented solely by dots, in the females they reach in one extreme (recessive) to shortly distad of the infracercal emarginations, on the more proximal segments even more decidedly broken into mere stigmatic dots, in the other extreme (intensive) they join on the subgenital plate, which is largely dark, while the segments distad to and including the antepenultimate are also solidly infusate.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, type.....	9.2	1.7	2.6	8.9 ¹	2.4 mm.
♀, allotype.....	7.6	1.8	2.7	8.3	2.3

We have seen in addition to the type and allotype of this species, which has most distinctive genitalic features in the male, five females taken from the fruit steamer 'Runa' at Philadelphia, from Port Antonio, Jamaica, May 8, 1922, by Max Kisiuk, and now in the collection of the Academy of Natural Sciences of Philadelphia. The form of the subgenital plate of the male is clearly that of a step in the line of development of the more highly specialized type seen in *C. insularis* and *C.*

¹Approximately. The apices of both tegmina have been somewhat damaged, so that an exact measurement cannot be taken. .

landalei, from the same island. Whether *jamaicensis* is restricted in distribution to any definite area of Jamaica remains to be determined.

Caribblatta insularis (Walker)

Plate II, Figure 9

Blatta insularis WALKER, 1868, 'Catal. Blatt. Brit. Mus.,' p. 101. ♀; Jamaica.

We have little information on this species additional to that given by Hebard in his discussion of the species.¹ The only locality known to him from material was Montego Bay, Jamaica. Whether this form, which has such remarkably distinctive male genitalia, is restricted to western Jamaica, remains to be determined.

Uvarov has examined the type of this species and compared it with material sent by us. His comment is as follows: "The type is in extremely bad condition, having been preserved in spirit; wings quite crumpled and almost unfit for examination. However, your identification seems to be correct though I hesitate to say so quite definitely." Under the circumstances it seems the use of the name *insularis* for this species is warranted and advisable unless the contrary is shown to be true.

We have removed from the synonymy of *insularis*, Saussure and Zehntner's *Theganopteryx* (*Pseudectobia*) *antiguensis*, from Antigua, which Hebard, in 1916, had considered as in part this species. On a preceding page we have discussed *antiguensis*, which we now consider to be a distinct member of the *Insularis* Group of the genus, probably restricted to the Virgin Islands and certain of the northern Lesser Antilles.

The relationship of the present species to those here associated with it is very close. The pronotal form is as in *C. stenophrys* and the pattern is quite similar, being well figured by Hebard, who also gave an excellent illustration of the facial pattern. The latter strongly suggests that of *C. jamaicensis*, while the form of the male subgenital plate clearly indicates the position of *insularis* in relation to *C. jamaicensis* and to *C. landalei*, both here described.

That the island of Jamaica furnished a home for four of the eight members of the *Insularis* Group, which is distributed from Jamaica eastward to the northern Lesser Antilles, but is absent from Cuba and the Bahamas, would seem to indicate that a large part of the development of the group may have taken place in Jamaica. On the other hand the Jamaican forms seem restricted to definite sections of the island; from no single locality has more than a single species been seen. Whether

¹1916, Trans. Amer. Entom. Soc., XLII, pp. 175-177, Pl. XI, figs. 8-12, Pl. XII, figs. 14-16.

future work will show these apparent localizations to hold true, or that two or more of the forms occur together under identical conditions, remains to be determined.

***Cariblatta landalei*,¹ new species**

Plate II, Figures 10 to 14

This most interesting species is more nearly related to *C. insularis* than any other species, sharing a marked and unusual "puckering" of the distal section of the male subgenital plate, having a pronotal pattern very similar and a facial pattern which has much in common with that of both *jamaicensis* and *insularis*. The form of the male subgenital plate is, however, so remarkably distinctive that it alone will prevent any possibility of confusion of the male of this insect with the same sex of the other species. The venter of the abdomen has a color pattern quite characteristic when compared with *C. insularis*, while the tegmina have a distinctive lineate pattern.

The female sex possesses a larger and more strikingly developed subgenital plate than the same sex of *insularis*, which, taken with the ventral abdominal pattern and that of the face, as well as the tegminal lineation, will serve to identify females of the species.

TYPE.—Male; Pleasant Hill, Blue Mountains, Jamaica. Elevation 3700–3800 feet. July 28, 1923. (Rehn; in bracts of banana blossoms.) [Academy of Natural Sciences of Philadelphia, Type No. 5404.]

The following features are chiefly those of noteworthy difference from *C. insularis* as described by Hebard.²

Size small; form elongate and slender; tegmina very slender.

Head with occipital interocular space subequal to occipital depth of eye.

Pronotum with general form as in *C. insularis*, but lateral angles at point of greatest width more evident, less rounded than in *insularis*.

Tegmina attenuate, with wings surpassing apex of abdomen by twice the pronotal length; anal field more elongate pyriform than in *insularis*, its attenuation in proportion to the general elongation of the tegmina.

Subgenital plate moderately transverse, in general appearance puckered or constricted in folds disto-mesad: disto-lateral margins converging, oblique subtruncate; general appearance of medio-distal portion of margin roughly concave-emarginate, the details of this area showing obtuse-angulate lateral angles which are subvertical in position and analogous to similar structure in *jamaicensis* and *insularis*, a small median arcuate labiation which is continued upon the surface of the plate proximad in a marked convex fold, and paired infra-stylar emarginations of unequal emphasis which are continued proximo-laterad on the surface of the plate and are separated from the median convex fold by marked concave folds; styles small, almost hidden in anal orifice, their dorsal surface with recurved teeth. The subgenital plate is slightly asymmetrical, in the exact character of the folding of its ventral surface as well as the specific details of the medio-distal portion of the margin.

ALLOTYPE.—Female; same data as type, except date is July 24, 1924. [Academy of Natural Sciences of Philadelphia.]

¹We take pleasure in dedicating this interesting species to Mr. and Mrs. W. H. Landale, of Pleasant Hill House, in appreciation of their kindly interest and assistance to Mr. Rehn, when he visited with them in the summer of 1923.

²1916, Trans. Amer. Entom. Soc., XLII, p. 175–177.

Differing from the description of the male sex chiefly in the following features.

Size apparently smaller than in male sex, due to shorter tegmina.

Head with occipital interocular space slightly greater than occipital depth of eye.

Tegmina surpassing apex of abdomen by not more than length of pronotum.

Subgenital plate large, moderately produced, its greatest length subequal to proximal width; pre-cercal section of lateral margins moderately arcuate, infra-cercal emarginations weak and very shallow, distal portion of margins nearly straight convergent to the very narrowly rounded apex.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, type.....	8.5	2	3	10.5	2.7mm.
♂, paratype.....	8.5	1.9	2.8	9.4	2.7
♀, allotype.....	9	1.9	2.7	9.8	2.5
♀, paratype.....	8.3	1.9	¹	9	2.7

General coloration of head, disk of pronotum, all of tegmina except marginal and external portion of scapular fields, dorsal and ventral surfaces of body and limbs ochraceous-buff, varying very slightly in depth; dark pattern, as described, prout's brown to mummy brown. Occiput with a transverse dark interocular bar, which dorsad is slightly deeper laterad than mesad: interantennal blotch of the facial pattern large, reaching from scrobe to scrobe, its greatest depth more than one-half the width of the bulk of the maculation, its dorsal margin with three angulations, the median the most extensive, an enclosed median spot always present, usually oval and rarely a trefoil in shape; a transverse infra-antennal dark bar of sinuate pattern strikingly indicated, occasionally broken mesad: ventral portion of face with four transversely disposed dark blotches along the clypeal suture, the median pair sub-trigonal, the lateral transversely elongate and narrow. All details of the facial pattern may be more clearly interpreted by consulting Plate II, fig. 11.

Disk of pronotum with pale base color somewhat lighter than on other surfaces; lateral portions clear hyaline; dark pattern as shown in Plate II, fig. 10, the paired central areas of this pattern distinctly clouded and blotched, with the component lineations less clearly evident than usual, supra-cervical lines sharp, with or without a transverse connecting line at the cephalic margin.

Tegmina with marginal field and costal half of scapular field clear hyaline; dark marking at base of anal sulcus decided and covering about a third of the sulcus; dark blotch on discoidal trunk in the usual position found in this group of species, generally extending distad along the humeral trunk as a dark cloudy line, in one specimen reaching half-way to the tegminal apex and, while varying considerably in depth and extent, this marking is always indicated. Venter of abdomen with broad, continuous, strongly marked intermarginal dark longitudinal bars, which generally meet and fuse on the proximal half of the subgenital plate. In the female sex this dark coloration covers a very large portion of the quite large subgenital plate. Occa-

¹Pronotum slightly damaged.

sionally a median dark bar is briefly indicated proximad on the venter of the abdomen. Limbs with a preapical dorsal dark femoral marking which on the cephalic pair is also indicated on the cephalic face, a dorsal lineation from the same marking extending well proximad on these cephalic femora and a lesser distance on the median femora; an evident pregenicular dark spot on all the tibiæ, vicinity of all spine insertions marked with dark, ventral margins of caudal femora sublineate with dark color.

In addition to the type and allotype we have before us nine male and seven female paratypes, all taken at the type locality. Of these two males and one female were secured on July 21, two males and three females on July 24, one male and one female on July 25 and the remainder on July 28. All were taken from under the drying bracts of banana blossoms in several tracts of mixed banana and coffee trees, at 3800 feet elevation on the Pleasant Hill estate. The species is exceedingly active and the series was taken only by stripping off the bracts while a deep net enveloped the greater portion of the blossom end of the cluster. In addition we have a male individual in the instar preceding maturity, taken on July 21 and under the same conditions as the others.

The measurements given show the limited extent of size variation that is present in the species, the figures presented representing approximately the range of size in each sex.

The width of the occipital interspace between the eyes varies slightly in the male sex, ranging from slightly narrower than the occipital depth of the eye to very faintly greater than the same. In the female sex this width shows little variation and is always appreciably greater than the depth of the eye.

The subgenital plate of the male varies but little in the bulk of the series in the exact strength of the foldings of the medio-distal region, these being as heavily indicated as described for the type in all except two individuals, in one of which the folds are less evident although the general form is the same, while in the second individual the folds are greatly reduced in size and character, so that they would at first examination seem non-existent, and the median protuberance is virtually absent, although the broad emargination and its lateral flanking angulations are fully indicated. The first-mentioned specimen is teneral and this condition doubtless explains the unemphasized character of the folds, while the aberration of the second individual has every appearance of being atavistic or teratological. Similar conditions are not rare in male blattids which normally possess highly specialized supra-anal and subgenital plates.

One female bears a partially protruded oötheca, which is carried with the carina dorsad.

CARIBLATTOIDES,¹ new genus

This genus is related to *Cariblatta* and *Neoblattella*, rather nearer the former, and showing to *Neoblattella* much the same character of relationship as does *Cariblatta*. The intimate relationship of the three groups is clearly evident, but their proper sequence in a linear arrangement is not easy to determine. The principal feature of difference from *Cariblatta* (as represented by *C. delicatula*, the genotype, and also by the rather aberrant *C. punctipennis*) is the distinctly flattened and deplanate pronotum, which is relatively larger than in *Cariblatta*. In addition, the tegmina are seen to be longer, regularly more narrow with the margins subparallel. Through the aberrant *Cariblatta punctipennis* the generic relationship is seen to be close, but the two entities are distinct, clearly recognizable when studied, and with individual combinations of characters, which are not, however, clearly expressible as differential features.

From *Neoblattella* (using the genotype, *N. adpersicollis*, for comparison), the new genus is chiefly distinguished by the greater interspace between the eyes in both sexes, the palpal form, which resembles that of *Cariblatta*, the generally fewer discoidal sectors of the tegmina, the strongly deplanate pronotum, and the less strongly specialized tarsal claws. The *Neoblattella* complex is so extensive, and our exact information on the species really composing it so limited, that we can speak of it only in a qualified manner. We are restricting comparisons with *Neoblattella* to the genotype and closely allied species, as it is becoming more evident that a number of genera are really included in the mass of species generally assumed to belong to *Neoblattella*.

GENERIC DESCRIPTION.—Size small; form depressed; females slightly broader and heavier than males, size approximately similar. Head subdepressed, distinctly and broadly visible cephalad of pronotum; interocular space wide, considerably greater than depth of eye; lateral margins of face regularly and relatively strongly convergent ventrad: antennæ elongate, first joint elongate, large, cingulate on portion of proximal section: maxillary palpi with third joint elongate, slender; fourth joint shorter than third joint; first joint slightly shorter or slightly longer than fourth joint.

Pronotum with dorsum appreciably deplanate, transverse elliptical in outline, greatest width faintly caudad of the middle; cephalic margin truncato-arcuate, narrower than caudal margin; lateral margins arcuate; caudal margin broad, truncato-arcuate: lateral sections very broad, little differentiated from disk by contour, hyaline; disk in shape roughly octagonal, the cephalic and lateral angles, at least, rounded; caudal hyaline section well indicated.

Tegmina elongate lanceolate, considerably surpassing the abdomen in both sexes (female of *instigator* unknown): costal margin moderately arcuate proximad, sutural

¹From *Cariblatta* and *elbos* form.

margin almost straight: scapular field broad; discoidal sectors longitudinal, six to seven in number (including the median and ulnar and rami of the median veins); anal sulcus strongly arcuate proximad, straight oblique in greater portion of length; anal field elongate pyriform; diagonal channel (diagonal vein of authors) of right tegmen well indicated. Wings elongate, relatively narrow, moderately iridescent: mediastine and a number of costal veins clavate; ulnar vein quadriramose; axillary vein with three rami in distal two-thirds; intercalated triangle small but distinctly and clearly defined.

Abdomen unspecialized: supra-anal plate transverse in both sexes; cerci elongate, fusiform, depressed, composed of eleven segments, apex acuminate: subgenital plate of male symmetrical or weakly asymmetrical, with pair of very short, thick, equal or unequal styles, the surface of which is armed with adpressed claw-like spines: subgenital plate of female large, scoop-shaped, produced, narrowing distad.

Cephalic femora with ventro-cephalic marginal spination of "Type A," proximad in the series being a few (four) large spines, followed by a variable number of short or very short, but distinct and robust, spines, distad two large unequal spines; ventro-caudal margin of cephalic femora with three to four spines in distal half. Median and caudal femora with each ventral margin having a single distal spine, the remainder of the margins with other long spines. Tarsi with well-developed arolia; pulvilli small, present on four proximal segments, terminal, acute, produced; tarsal claws with an internal flange, the margin of which is straight or subserrulate.¹

A color feature shared by both of the species of the genus, and which is to that extent a generic feature, although we would hesitate definitely to call it such, is the opaque white border of the costal margin of the wing. This is narrow proximad, expanding to include the clavate portions of the costal veins and then narrowing and becoming obsolete before the apex.

GENOTYPE.—*C. suave*, new species.

KEY TO SPECIES

- Maxillary palpi with fourth joint distinctly longer than fifth joint. Head more depressed. Tegmina with discoidal sectors eight in number, weakly nodulose in distal half. Styles of male subgenital plate unequal in size. Cephalic femora with smaller spines of ventro-cephalic margin six to seven in number. General coloration not strikingly bilineate. Head without dark interocular bar. (Porto Rico.) *suave*, new species.
- Maxillary palpi with fourth and fifth joints subequal in length. Head less depressed. Tegmina with discoidal sectors seven in number, non-nodulose. Styles of male subgenital plate equal in size. Cephalic femora with smaller spines of ventro-cephalic margin thirteen in number. General coloration strikingly bilineate on pronotum and to a lesser degree on closed tegmina. Head with dark interocular bar. (Cuba.) *instigator*, new species.

***Cariblattoides suave*,² new species**

Plate III, Figures 1 to 5

TYPE.—Male; Aibonito, Guayama, Porto Rico. July 14–17, 1914. (H. G. Barber.) [New York Academy of Sciences; American Museum of Natural History.]

¹Apparent only when highly magnified.

²From *suavis* = agreeable.

The leading features separating this species and *C. instigator* are given above in the key.

Size small; form depressed; surface of dorsum moderately polished.

Head appreciably flattened, in outline elongate trigonal, but with the eyes slightly rounded bullate, the infra-antennal portion of head thus apparently narrowed in addition to the regular convergence of the lateral margins of that portion: vertex straight, interocular space equal to one and a half times the greatest depth of eye: face moderately arcuate transversely, nearly straight longitudinally from inter-antennal region: eyes subreniform in outline, strongly narrowing ventrad: ocellar spots of medium size, more distant than most approximate points of eye margins: antennae elongate; maxillary palpi with fifth joint appreciably shorter than fourth joint, compressed, regularly narrowing from proximal portion.

Pronotum with cephalic margin moderately arcuate, regularly passing into lateral margins; lateral hyaline portions very broad, but little narrowing cephalad.

Tegmina surpassing the apex of the abdomen by slightly more than the length of the pronotal disk, relatively narrow, approximately subequal in width in the greater portion of length, the apical section with costal margin faintly arcuate convergent to the immediate apex, which is nearer the costal than the sutural margin, narrowly rounded acute-angulate: marginal field relatively broad, elongate; scapular field broad; principal veins and rami scattered subnodulose distad; costal rami in scapular field numerous, oblique; discoidal sectors six to seven in number, including main median vein and ulnar vein; anal field with five axillary veins. Wings with apex of anterior field narrowly rounded rectangulate; six costal and the mediastine veins elongate clavate, less heavily so than in *instigator*.

Supra-anal plate with margin obtusely arcuate, very faintly emarginate mesad, the margin of plate with regular, spaced series of long bristles, some directed horizontally, other deflected ventrad: subgenital plate broad, flattened, moderately asymmetrical, the sinistral side of the distal margin markedly sigmoid, the dextral side shorter, weakly sigmoid, apex of plate slightly dextral in position, bilobate emarginate in shape; styles unequal in size, the left short and thick, appreciably recurved and with one dorsal spine larger than others and unguiculate in form, the right style very short, in fact a mere knob or base for the teeth on its surface.

Cephalic femora with ventro-cephalic margin armed with two large, unequal, distal spines, then proximad a series of seven to eight short, well spaced, thick and heavy spinulations, followed by a proximal group of four much more widely spaced, large spines.

ALLOTYPE.—Female; same data as type.

Differing from the description of the male sex (type) in the following features.

Head slightly less depressed than in male, with the eyes slightly less evident when seen from ventral surface, the infra-antennal portion of head narrowed solely by the regular convergence of the margins.

Pronotum slightly more transverse, the lateral margins more arcuate divergent caudad to the point of greatest width; lateral hyaline portions very broad.

Tegmina slightly shorter and broader proportionately than in the male.

Supra-anal plate as in male; subgenital plate projecting appreciably distad of supra-anal plate, large, scoop-shaped, produced, narrowing distad, distal margin strongly arcuate, with numerous chaetiform hairs.

General color of male shining dark pitch brown, this color embracing the disk of the pronotum, all of the tegmina excepting the marginal and costal four-fifths of

the scapular fields, and the dorsal and ventral surfaces of the abdominal and thoracic segments. Lateral portions of pronotum and the costal portion of the tegmina hyaline, of the tegmina tinted with buffy near the sharp dividing line between the dark-colored and hyaline areas. Head mars yellow to mars brown, the buccal region, ocellar spots and palpi antimony yellow, the latter fuscous tipped; eyes cinnamon-brown to mummy brown; antennæ of general color except that the proximal joint is yellowish with lines on internal and external faces of the general color. Wings infumate with pitch brown, the tone varying in depth, always strongest distad, the costal margin in the vicinity of the clavate costal veins and narrowly distad, opaque white. Femora, tibiæ, two proximal tarsal joints and a portion (intensive) or most (recessive) of coxæ antimony yellow to pale ochraceous-orange, distal portion of tarsi pitch brown. Cerci narrowly tipped with yellowish or whitish.

General coloration of female of much the same type as in male but never so sharply contrasted or as solidly grouped, and with ventral surface of abdomen different. General color ranging from pale buckthorn brown to weak pitch brown. Head mars yellow, the face largely as pale as the buccal region alone in the male; palpi pale, hardly tipped with dark; eyes tawny to mummy brown; antennæ as in male except that mesad and distad the pitch brown passes into dresden brown. Pronotum with disk never solidly colored, always with indications, more or less evident, of the usual central lyrate pattern of species of *Cariblatta*, laterad the disk bears indications of paired diverging bars of prout's brown, these not being sharply defined and entirely independent of the lyrate pattern, which shows through the less opaque bars. Tegmina with the contrast between the two sections but little indicated in those of relatively pale (recessive) general coloration, more decided in the darker (intensive) specimen, which latter has the dark section irregularly sprinkled with translucent areas of pale ochraceous. Wings as in male. Dorsum of abdomen pitch brown; venter of abdomen ranging from pitch brown with a rufescent subgenital plate, which is bordered with pitch brown (intensive), to ochraceous-buff with a pitch-brown median portion proximad, the intermediate condition showing suffusion of the lateral pale borders. Limbs as in male.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Aibonito, Porto Rico, type.....	8.6	2.3	3.3	10.3	3 mm.
♂, Aibonito, Porto Rico, paratype.....	8	2.2	3.1	9.7	3
♂, Aibonito, Porto Rico, paratype.....	8	2.2	3.2	10.3	3
♂, Arecibo, Porto Rico, paratype.....	7.3	2	3.1	9.5	2.9
♀, Aibonito, Porto Rico, allotype.....	9.8	2.6	3.7	11.5	3.5
♀, Aibonito, Porto Rico, paratype.....	8.5	2.4	3.4	10	3
♀, Aibonito, Porto Rico, paratype.....	9.4	2.6	3.7	10.3	3.1

In addition to the type and allotype we have before us, all from Porto Rico, one male and two females, taken with the type and allotype; a third male taken at Aibonito, June 1-3, 1915, (Lutz and Mutchler; hills north of town); a fourth male taken at Arecibo, Arecibo, July 30-August 1, 1914, (H. G. Barber; beating on dry limestone hills), and a fifth male from Rio Piedras, San Juan, July 8, 1921, (G. N. Wolcott), from the U. S. National Museum. All of the above other than the type and allotype we consider paratypes. These specimens show no noteworthy differences from the descriptions given above. The allotypic female is recessive in coloration, as is also one of the other females, the third being of the intensive phase.

It is of interest to note, in connection with the relationship¹ of this genus and the two species, that in the recessive type of female of the present species, the *Cariblatta* lyrate pronotal pattern is quite evident, thus pointing to affinity with that genus, as corroborated by features of the structure. Also in the recessive females we see evidence of paired diverging dark pronotal bars, which features are strongly marked in *C. instigator*.

***Cariblattoides instigator*,¹ new species**

Plate III, Figures 6 to 9

TYPE.—Male; Guantanamo, Oriente Province, Cuba. (C. F. Ramsden.) [Academy of Natural Sciences of Philadelphia, Type No. 5359.]

Size small; form moderately depressed; surface of dorsum moderately polished.

Head in outline elongate subtrigonal; the eyes broadly rounded in outline; interspace between eyes equal to approximately one and a half times the greatest depth of eye; face moderately arcuate transversely, weakly so longitudinally; eyes subreniform in outline, narrowing ventrad; ocellar spots relatively large, slightly more distant than most approximate points of eye margins; antennæ elongate; maxillary palpi with distal joint subequal to fourth joint, moderately compressed, considerably inflated, regularly narrowing in distal two-thirds.

Pronotum with cephalic margin much narrower than caudal margin, lateral margins strongly arcuate convergent from point of greatest width of pronotum to their broadly arcuate point of juncture with cephalic margin; lateral hyaline portions broad, narrowing cephalad.

Tegmina surpassing apex of abdomen by about length of pronotum, narrow, subequal in width, distal two-thirds of costal and sutural margins subparallel; apex nearer costal margin, rounded acute-angulate, sutural margin in distal third obliquely arcuate to the apex; marginal field relatively narrow, elongate; scapular field slightly narrower than in *suave*, costal rami in scapular field numerous, oblique; discoidal sectors seven in number including main median vein and ulnar vein; anal field with five axillary veins. Wings with apex of anterior field rounded; nine costal veins and the mediastine vein strongly elongate clavate.

¹An *instigator* or *stimulator*, in allusion to the puzzling features of this and the allied species.

Supra-anal plate with margin obtuse-angulate, shallowly and very broadly V-emarginate mesad, margin of plate with a regular, spaced series of slightly deflected bristles: subgenital plate short, flattened ventrad and with lateral portions vertical, U-shaped in proximal section, distal margin with a short, median, rounded tubercle; styles closely placed on each side of median marginal tubercle, symmetrical, very short, thick, each on dorsal surface with a group of recurved, claw-like spines, directed mesad.

Cephalic femora with ventro-cephalic margin armed with two large, unequal, distal spines, then proximad a series of numerous, very short, closely placed, but thick and heavy, spinulations, following by a proximal group of four much more widely spaced, large spines.

General color of disk of pronotum, head, limbs, and dorsal and ventral surfaces of abdomen, warm buff, the dorsum of the abdomen weakly washed with raw umber, the venter of the same laterad with a curved line of raw umber and a bold spot of fuscous, the proximo-ventral segment weakly bordered with raw umber. Head with a broad interocular bar of deep chestnut-brown on the vertex; palpi distad clouded with raw umber; antennæ with distal five-sixths suffused with raw umber, deepening distad, proximal joint lineate with raw umber on external face; eyes blackish fuscous. Pronotum with the disk bordered laterad by a pair of broad, divergent, deep mummy brown bars, the margins of which are appreciably undulate; lateral portions of pronotum hyaline. Tegmina in general hyaline, with a slight buffy tinge, a broad continuation of the pronotal dark bar, in prout's brown, carried along the region of the humeral trunk, in the proximal half broad, solid and sharply defined, in the distal half weakened and spread, as a suffusion, over the greater portion of the discoidal field. Wings very faintly tinted with brownish, the veins pencilled with dresden brown, the costal margin with a relatively broad section involving all the clavate portions of the costal veins and a narrow border running to the base of the wing, opaque white. Cerci light buff, the proximal dorsal segment fuscous, the ventral segments each with a fuscous patch covering most of the segment. Limbs with the points of insertion of tibial spines marked with fuscous dots.

Length of body, 9 mm.; length of pronotum, 2.4; greatest width of pronotum, 3.5; greatest length of tegmen, 9.6; greatest width of tegmen, 2.7.

The type of this most interesting species is the only adult seen by us. It is unfortunate we are not acquainted with the adult female, as it would be interesting to know whether *instigator* displays as much sexual differentiation as *suave*.

We have before us five immature specimens, one male and four females, taken at Cabañas, Province of Pinar del Rio, Cuba, September 5-8, 1913, (Leng; siftings from under sea-grapes, other shrubs, and low trees), which are assignable to this species. The specimens represent at least three instars. The male shows simple, widely separated, short, rounded styles on the subgenital plate, with no suggestion of the peculiar type later acquired. Between these styles, mesad, is placed a small, shallow, broadly V-shaped emargination. The general colors of these specimens is similar to those of the adults; the dorsal surface bears a very

characteristic color pattern, which roughly consists of paired dark lateral bars on the pronotum, as in the adult, these bars converging and connected cephalad, while they are continued caudad over the other thoracic segments and most of the abdomen, broken proximad on the metanotum, and broadly expanded and arcuate on the abdomen, converging and fusing on the sixth tergite. Mesad the pronotum, mesonotum and proximal portion of metanotum bear a pair of fine dark lines, more approximate on the pronotum and not reaching the cephalic margin of same. Abdomen with proximal tergite largely dark, second to fifth with a median oval dark area, connected with the transverse dark marking on the sixth tergite. Distal tergites edged laterad with dark. Head with interocular dark bar as in adult; face with three complete and one incomplete transverse arcuate bar lines, or these are represented solely by lateral dots.

NEOBLATTELLA Shelford

The present is one of the largest American genera of the Blattidæ. The great variety of species would seem to form apparently natural groups, which show marked developments along radiating lines, frequently closely approximating allied genera. The genus as now understood is of tropical American origin, and its diversity, particularly in features of the male sex, is extraordinary, so much so, in fact, that it may be necessary to divide it into a number of genera to properly express the relationship of the forms. To do this, however, or for that matter as definitely to prove such action unwarranted, will require the examination of a great number of species, and at this writing no collection in the world is sufficiently representative to warrant such a study. In the meantime we are referring to the aggregations of species as "groups," placing them about some one of the species, the name of which the group bears. But three of these groups are represented in the West Indies, and as far as known two are peculiar to that archipelago. The three are the *Nahua* Group, the *Detersa* Group and the *Lucubrans* Group. The first of these also occurs in Central and South America. The third is utilized here for four species concerning which our knowledge is limited, as we are not acquainted with the male sex of two of them, but all of which show certain features of affinity in the known sexes.

The males of *Neoblattella* show a most astonishing diversity of genitalic development, and in some groups the dorsal surface of the male abdomen is distinctly specialized. The females, however, show little or no response to the specialization found in the opposite sex, so that accurate specific determination is either impossible or can be made only after

a most careful check up of other, and usually far less evident, features of difference. To weigh these properly a knowledge of the usual differences between the sexes is essential, while field knowledge is also of great value.

Nahua GROUP OF THE GENUS *Neoblattella*

Brunner in 1892¹ reported Stål's *Blatta adspersicollis* from St. Vincent, and later² from Grenada as well. We have been able to examine some of the material reported by him from each island. This not only does not represent *N. adspersicollis*, which we now know is not present in the West Indies, or even in northern South America, but in fact the material does not even belong to the *Adspersicollis* Group of the genus. The chief difference between the *Adspersicollis* Group and the *Nahua* Group is the absence in the former and presence in the latter of marked lateral specialization of the fifth tergite of the male.³ It is evident that the Grenada and St. Vincent material seen by us represents an undescribed member of the *Nahua* Group.

The *Nahua* Group is now known to be composed of four species: i. e., *nahua* (Saussure), ranging from tropical Mexico to Panama; *aristonice* Hebard,⁴ from French Guiana; *laodamia* Rehn and Hebard, here described from the Lesser Antilles, and *fraterna* (Saussure and Zehntner) ranging from tropical Mexico to Panama. There exists no doubt in our minds that additional representatives of the group will be found in the humid tropical portions of northern South America, thus connecting the apparently separated distributional areas.

Neoblattella laodamia,⁵ new species

Plate II, Figures 15 to 17

P [hyllodromia] adspersicollis BRUNNER, 1892, Proc. Zoöl. Soc. London, 1892-
p. 202. St. Vincent, West Indies.

P [hyllodromia] adspersicollis BRUNNER, 1893, idem, 1893, p. 601. Grenada,
West Indies.

More nearly related to *N. aristonice* Hebard, recently described from French Guiana,⁶ differing most markedly in the less transverse, more trigono-trapezoidal pronotum, in the greater occipital interspace between eyes (♂), in the less produced (caudad) and less sharply reflexed lateral specialization of the fifth tergite, and in the more produced and linguiform supra-anal plate of the male, which is more decidedly emarginate at the apex. From the Central American *N. nahua* the present insect differs in the same features as it does from *N. aristonice*, and in addition in

¹1892, Proc. Zoöl. Soc. London, 1892, p. 202.

²1893, Idem, 1893, p. 601.

³See Hebard, 1920, Mem. Amer. Entom. Soc., No. 4, p. 64.

⁴1926, Proc. Acad. Nat. Sci. Phila., 1926, p. 170.

⁵From *Λαοδάμεια*, daughter of Bellerophon.

⁶*Loc. cit.*

the more robust styles of the male subgenital plate, and in the caudal metatarsus in the male being twice as long as the remaining caudal joints (instead of one and one-half times as long as in *N. nahua*).

TYPE.—Male; Windward side, St. Vincent, West Indies. (H. H. Smith.) [British Museum of Natural History.]

Size large (for genus); form as usual in the group; surface moderately polished.

Head moderately deplanate, subpyriform, somewhat deeper (about one-sixth) than greatest width across eyes; occiput and eye outline regularly arcuate; occipital interspace between eyes slightly less than occipital depth of eye, faintly more than half that between ocellar spots. Palpi elongate, slender; penultimate and antepenultimate joints subequal in length, the former virtually straight and subequal in width, the latter moderately infundibuliform; ultimate joint faintly more than two-thirds as long as the penultimate joint, shallow, moderately compressed.

Pronotum trigono-trapezoidal in outline, greatest length contained nearly one and one-third times in greatest width of same, which is at caudal third: cephalic margin strongly arcuate, passing into diverging, more gently arcuate lateral margins without a distinct angle; point of greatest width well rounded, the outline passing through short, oblique, subtruncate caudo-lateral sections, and a weak but appreciable angle to the weakly arcuate caudal margin: in transverse section a trigonal area made up of the caudal portion of disk and vicinity of caudal margin is deplanate, hyaline lateral areas and adjacent latero-cephalic portions of disk broadly and markedly declivent.

Tegmina surpassing apex of abdomen by length of pronotum, greatest width contained about three and one-half times in greatest length: costal margin well arcuate in proximal half, distal half straight, narrowly rounding to apex: marginal field relatively broad, reaching distad as far as apex of anal field: costal veins sixteen to seventeen in number (total number of rami in scapular field); discoidal rami eleven in number (including ulnar vein); axillary veins five in number. Wings with fourteen costal rami (exclusive of extreme distal rami of discoidal vein), these non-clavate; ulnar vein with five complete rami, the two distal of which are bifurcate: medio-discoidal and medio-ulnar areas narrow and subequal in width; intercalated triangle small.

Fifth abdominal tergite with distal margin truncate in median half of tergite, laterad the tergite develops into well-defined lobations, which are integral parts of the tergite but each well differentiated from its median section by an arcuate elevation, making the lobation virtually as long laterad as proximal breadth of same, projection distad of median section of margin a distance nearly equal to one-third the entire length of the lobe, external margin of lobes straight, slightly oblique, for a distance nearly equal to a third of proximal width of lobe bent obliquely dorso-laterad; surface of proximal section of these lobes bears a large ovate impression (mesad) and a small circular one (laterad). Sixth tergite with its distal margin bisigmoid, weakly elevated and substrate mesad. Surface of fourth, fifth and sixth tergites bearing a longitudinally disposed, semi-ovate depressed area mesad. Supra-anal plate trigonal produced, greatest width at base little greater than greatest median length, distinctly surpassing subgenital plate; converging margins of production concave, apex shallowly emarginate, laterad of same arcuate to concave lateral margins, the whole apex thus biarcuate; in transverse section the plate is strongly guttered by the dorsal flexure of the lateral sections. Cerci elongate, tapering, articles of moderate length, little evi-

dent proximad. Subgenital plate relatively short, transverse, margin as a whole arcuate; stylar fossæ small, separated by more than twice the length of the styles, the latter simple, subequal in width, apex bluntly rounded.

Caudal tarsi with metatarsus twice as long as remaining tarsal joints together, slender; metatarsus and succeeding tarsal joint biseriate spinulose ventrad; pulvilli large.

General color of dorsum clear yellow ocher, with a buckthorn brown tendency on the tegmina aside from marginal field; disk of pronotum with its base color between ochraceous-buff and zinc orange. Pronotal disk spots prout's brown, pattern consisting of a pair of median groups of three spots each, these roughly trigonal in shape; cephalad with an indefinite well-spaced pair followed by a more widely spaced pair, then a pair of spots laterad of central paired groups and at lateral boundaries of disk, and finally a closely placed caudal pair of spots. Base color of head, coxæ and limbs ochraceous-buff. Interocular region with band of cinnamon-brown; face with three pair of equally spaced dots of the same color, one interocellar, the next inter-antennal and the third pair equidistant between the second and the base of the clypeus; an accessory pair of less evident spots, more closely placed, occasionally (paratype) indicated between second and third pair of spots; dorsal and ventral margins of scrobes pencilled with dark; lateral margins of face, approximately on level of third pair of facial spots, and occasionally maxillary articulation marked with same color. Eyes between auburn and mummy brown. Dorsum of abdomen washed with mummy brown on an ochraceous base, less decidedly so proximad; venter of abdomen of a similar combination, but dark overlay irregularly clouded over proximal segments and on distal ones largely limited to lateral areas; subgenital plate in type margined distad with same dark color. Cerci largely washed with mummy brown.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, St. Vincent, type...	16	4.5	5.7	18.4	5 mm.
♂, Balthazar, Grenada, paratype.....	14.2	3.8	4.9	16.5	- 4.2

In addition to the type we have examined a male from Balthazar (windward side), Grenada, taken by H. H. Smith, one of the originally reported series of Brunner, and belonging to the British Museum of Natural History. This we are considering a paratype. It is appreciably smaller than the type, but agrees fully in all essential features. The inter-stylar margin of the subgenital plate in the paratype is somewhat thickened on each side of median line.

The range of the species probably covers a considerable section of the Lesser Antilles, and it doubtless occurs in the islands intervening between the two from which we definitely know the insect. Whether it occurs to the northward of St. Vincent remains to be determined.

We have examined the following material from Dominica which represents a species of the *Adspersicollis* or *Nahua* Groups of the genus *Neoblattella*, but without adult males any attempt at definite reference, even to groups, would be hazardous.

DOMINICA.—Long Ditton, VI, 19, 1911, (F. E. Lutz), 2 ♀, 1 immature ♀. Roseau, VI, 22, 1911, (F. E. Lutz), 1 immature ♂.

It is quite certain, however, that this material represents a species very distinct from *N. laodamia*, described above. The pronotum is more semielliptical, more deplanate and with less evident points of greatest width; the marginal field of the tegmina is narrower, while the caudal metatarsus is proportionately somewhat shorter. The character of the subgenital plate and supra-anal plate of the immature male, which is in the instar preceding maturity, would indicate different types of structure from those known to occur in *laodamia*.

THE *Detersa* GROUP OF THE GENUS *Neoblattella*

In the West Indies we find a group of the genus *Neoblattella* which is, as far as known, autochthonous, although three species (*celeripes*, *tridens* and *detersa*) have been taken as adventive forms in the United States. In the Greater Antilles occur eleven species of this group, while in the Lesser Antilles it is represented by at least one species, but the relationship of this to the Greater Antillean forms is not definitely known, as we have no male individuals for study, and the differential characters in the group are very largely in the male genitalia.

The species known to belong to this group are *carcinus*, new species [Hispaniola], *vatia*, new species [Cuba], *eurydice*, new species [Jamaica], *proserpina*, new species [Jamaica], *celeripes*, new species [Jamaica], *tridens*, new species [Jamaica], *detersa* (Walker), [Jamaica], *semota*, new species [Jamaica], *adusta* (Caudell), [Porto Rico], *borinquenensis*, new species [Porto Rico] and *vomer*, new species [Porto Rico]. From this it will be seen that, as far as our present knowledge goes, the group reaches its maximum division in Jamaica, although its maximum differentiation might well be said to occur in Porto Rico, as one of the forms peculiar to that island (*adusta*) has one of the most complex genitalic structures and another (*vomer*) has the simplest in the group.

The Lesser Antilles females mentioned above have the following data.

DOMINICA.—Laudet, VI, 11, 1911, (R. W. Miner; under bushes), 1 ♀. Long Ditton, VI, 20, 1911, (Lutz; in short grass and weeds), 1 ♀.

These may represent *borinquenensis* or *adusta*, to which under any circumstances they are most closely related, but they are distinctly

larger than the former, with the interspace between the eyes narrower and the pronotal disk weakly, sparsely and rather obscurely marked. The discoidal sectors are more numerous (10 to 11) than in *adusta*. Without accompanying males no further comment on these specimens seems desirable at this writing.

In order to assist in the recognition of the species of the *Detersa* Group we have constructed a key upon the male genitalic features. This will be found to function with satisfaction as far as males are concerned. It is virtually impossible to build a key which will be of service for identifying the female sex of the species. Having but few distinguishing features in the genitalia there is in that sex little in the way of readily appreciable characters which could be utilized in a key. The present table is purely artificial, made solely for service, and does not attempt to show phylogeny in the position of the species. The arrangement of the species in their individual treatment presents our ideas of their relationship as far as possible in a linear sequence.

MALES

1. Subgenital plate with distal margin arcuately obtuse-angulate, no extra median or accessory lateral productions of margin. Styles normally hidden. [Cuba.] *vatia*, new species.
 Subgenital plate variously developed, distal margin in general form acute-angulate, or with median or median and accessory productions, or in general form the plate is subrectangulate, trapeziform or subquadrate. Styles apparent. 2.
2. Production of distal margin of subgenital plate as a whole and embracing all of interstyler area, acute trigonal produced, no accessory productions of this margin mesad of styler fossæ. [Porto Rico.] *vomer*, new species.
 Production of distal margin of subgenital plate variously developed, interstyler area never acute trigonal as a whole, this margin generally with interstyler accessory production of some type. 3.
3. General form of subgenital plate subquadrate or trapeziform as seen from venter, length and breadth more nearly subequal, not transverse subrectangulate. No median production of distal margin of plate. 4.
 General form of subgenital plate transverse subrectangulate as seen from venter, distinctly broader than long without consideration of median production of distal margin, not subquadrate or trapeziform. 5.
4. Supra-anal plate with distal margin entire. Lateral portions of subgenital plate distad of styler bases thickened and supplied with stout spinulæ; styles rod-like, armed on disto-internal face with fine denticulations. [Porto Rico.] *adusta* (Caudell).
 Supra-anal plate with distal margin shallowly obtuse-angulate emarginate mesad. Lateral portions of subgenital plate reflexed dorsad, not thickened or supplied with spinulæ; styles spiniform, tapering; non-denticulate. [Porto Rico.] *borinquensis*, new species.

5. Distal margin of subgenital plate mesad obtusely trigonal produced, never with a falciform or similar development. 6.
Distal margin of subgenital plate mesad produced into a structure of varied form—subfalciform, digitiform or linguiform. 8.
6. Supra-anal plate with distal margin distinctly emarginate mesad. Median section of distal margin of subgenital plate broadly obtuse trigonal with the immediate apex emarginate; a pair of accessory juxtastylar appendages of margin sublamellate and folded on themselves in a sigmoid fashion. [Hispaniola.] *carcinus*, new species.
Supra-anal plate with distal margin either entire or very faintly subemarginate. Median section of distal margin of subgenital plate with a smaller median trigonal production, with or without flanking lobulations of the same margin, apex of median production never emarginate and accessory appendages of margin never folded. 7.
7. Form as usual in genus, pronotum not proportionately larger and tegmina and wings markedly surpassing apex of abdomen. Supra-anal plate with margin very faintly emarginate mesad. General form of distal margin of subgenital plate transversely truncate with a median trigonal production, no lateral accessory lobulations present. [Jamaica.] *eurydice*, new species.
Form proportionately robust for genus, pronotum markedly larger and heavier, tegmina and wings more corneous than usual, but slightly surpassing apex of abdomen. Supra-anal plate with margin entire. Distal margin of subgenital plate with a larger median trigonal and pair of lower rounded productions at the lateral angles, the margins of all of which bear distinct spines. [Jamaica.] *proserpina*, new species.
8. Supra-anal plate with margin entire. Median production of distal margin of subgenital plate greatly developed, slender, subfalciform, compressed mesad, subclavate distad; no lateral accessory developments on margin. (Marked interocular bar and accompanying transverse bar on upper face present.) [Jamaica.] *semota*, new species.
Supra-anal plate with median emargination. Median production of distal margin of subgenital plate never falciform, either linguiform or digitiform; lateral accessory developments on margin indicated. 9.
9. Median production of distal margin of subgenital plate linguiform, in profile decurved distad, its dorsal surface with shagreenous spiniform teeth. Interocular region and dorsal section of face without sharply defined transverse dark bars. [Jamaica.] *delersa* (Walker).
Median production of distal margin of subgenital plate digitiform, subcylindrical, without shagreenous teeth, apex rounded. Interocular region and dorsal section of face with a distinct interocular dark bar and at least indications of a similar one on face. 10.
10. Distal margin of subgenital plate, except for median digitiform production, subtruncate transversely, lateral portions of margin rounded rectangulate with a few shagreenous teeth. Dark transverse bar on dorsal section of face not strongly marked. [Jamaica.] *celeripes*, new species.
Distal margin of subgenital plate tridigitate, caudo-lateral angles of plate produced into diverging structures similar to the median productions, but broader, intervening sections of distal margin oblique. Dark transverse bar on dorsal section of face well marked but broken mesad. [Jamaica.]
tridens, new species.

Neoblattella carcinus,¹ new species

Plate III, Figures 10 to 13

This species is a relative of *N. vatia*, but the striking features of the male genitalia are exceedingly characteristic and will prove of the greatest value in that sex in the recognition of the species. There is also a marked suggestion of *detersa* in the male sex, but the relationship there is by no means as close. The females are far more difficult to distinguish, but the size is smaller in *detersa* and larger in *vomer* and *eurydice*. In addition the cerci in *carcinus* are not as strongly marked ventrad with dark fuscous as in *detersa*, and the whole abdominal coloration is not as contrasted. In *vatia* the female subgenital plate has no appreciable ventral medio-longitudinal sulcus distad, that is present in the other related forms except *proserpina*, which has a most characteristic heavy build.

TYPE.—Male; "St. Domingo" [Dominican Republic], Hispaniola. June 8, 1905. (A. Busck.) [United States National Museum.]

Size medium; form as usual in group.

Head sub-pyriform, about one and one-seventh as deep as greatest width across eyes, infra-ocular portion of head appreciably narrower than ocular width. Inter-ocular space at occiput equal to but slightly more than the occipital depth of eye, slightly greater than two-thirds the width between ocellar spots. Eyes prominent, when seen in cephalic aspect, bullate, extending ventrad not quite as far as ventral margin of antennal scrobes.

Pronotum transverse ovate, greatest length contained one and one-third times in greatest width of same, which is slightly caudad of middle: cephalic margin very weakly arcuate, without evident angle rounding into the arcuate diverging lateral margins, these passing regularly to the broadly rounded point of greatest width, whence the lateral margins are more strongly arcuate convergent to rounded, but more evident, caudo-lateral angles; caudal margin very faintly oblique-angulate: surface subdeplanate, very weakly declivent laterad.

Tegmina and wings surpassing apex of abdomen by more than the pronotal length. Tegmina elongate lanceolate, greatest width contained nearly four times in greatest length: costal margin appreciably arcuate in proximal half, thence straight and lastly rather briefly rounding to apex; sutural margin largely straight, distad obliquely arcuate to apex: marginal field short and relatively broad; scapular field broad, mesad occupying half of tegminal width; anal field occupying about three-eighths of total tegminal length, pyriform: costal veins (total venation of scapular field) fourteen to fifteen in number; discoidal sectors (including ulnar vein) eight to nine in number; six axillary veins.

Supra-anal plate strongly transverse, margin arcuate, mesad finely and rather broadly rectangulate emarginate. Cerci damaged. Subgenital plate complex, slightly asymmetrical, the distal margin mesad broadly angulate with the apex weakly emarginate and flanked laterad by small, very low, rounded lobes; at the lateral angles of the plate are developed the paired, elongate, converging, hinged styles, which taper distad and are subdeplanate proximad on their extensor surface, their apex dorsad, acute and accompanied a short distance ventrad by a distinct spine: placed mesad of the styles the margin of the plate is developed into equal sublamellate structures,

¹From *καρκίνος*, a crab or a pair of tongs, in allusion to the structure of the subgenital plate of the male.

folded on themselves in a sigmoid flexure, distad with a pair of spines; genital hook elongate, of the usual recurved type, the apex weakly bulbous.

Limb spination as usual in group. Caudal tarsi damaged.

ALLOTYPE.—Female; San Francisco Mountains, thirteen kilometers north of San Cristobal,¹ Province of Santo Domingo, Dominican Republic, Hispaniola. September, 1905. (A. Busck.) [United States National Museum.]

Differing from the male sex in the following noteworthy features.

Interspace between eyes at occiput about half again as great as occipital depth of eye.

Supra-anal plate moderately transverse, distinctly trigonal, the converging margins very faintly arcuate-emarginate, the apex as a whole rather narrowly enclosing the fissure.² Cerci very elongate, subfusiform, greatly tapering distad, the joints of distal four-fifths quite elongate and largely moniliform; apex very acute: dorsal surface of cerci deplanate, rounded beneath, segments individually subtumid. Subgenital plate very large, scoop-shaped, narrowing distad and there compressed, the apex narrow, the ventral surface in that region with a brief but appreciable median sulcation.

General color between ochraceous-buff and ochraceous-orange, distad the tibiae and tarsi are washed weakly with ferruginous. Interocular portion of occiput, dorsal section of face and ocellar spots in male washed with ferruginous,³ of female with a pale fuscous interocular bar and the face has three weak cross-bars, the dorsal one roughly W-shaped on ventral margin; eyes cinnamon-brown. Pronotum with lateral sections hyaline, tinted with general color, opaque disk in type with a median pair of circular dots of pale mummy brown, cephalad weak intimations of a more spaced pair; from this type we find certain females varying in the absence of the cephalic intimations and possessing extra comma-like dashes and supplementary dots laterad of the central pair, one pair of dots at lateral margins of disk. Venter of abdomen with pale lateral edgings of light buff, within which on each segment is a cloud of prout's brown, the stigmatic spot a sharply defined dot of the same color.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♂, "Dominican Republic," type..	11.3	3.3	4.5	14.2mm.
♀, Sanchez, Dominican Republic, paratype.....	10.8	3.5	4.7	12.2
♀, San Francisco Mountains, Dominican Republic, allotype...	12.7	3.6	4.5	14.3

In addition to the type of this peculiar species, which is apparently limited in distribution to Hispaniola, we have before us two paratypic females bearing the following data.

¹See page 11, footnote 1.

²This is as figured in the San Francisco Mountains specimen. In the Sanchez female there is no fissure and the margin is entire. The plate in the latter is, however, quite translucent in that region and the closing may be merely that of a membrane, although this may be a feature of individual variation or we may possibly have two species in the females. We do not, however, incline toward the latter view.

³The condition in the male is probably due, in part at least, to discoloration.

Sanchez, Province of Samaná, Dominican Republic, Hispaniola, May 22-27, 1915, (Watson; west of town), 1 ♀.

Blanton Mine,¹ north of San Cristobal, Santo Domingo Province, Dominican Republic, Hispaniola, July 26, 1917, (H. Morrison), 1 ♀, [U. S. N. M.].

***Neoblattella vatia*,² new species³**

Plate V, Figures 1 to 6

A very distinct member of the *Detersa* Group, chiefly characterized by the structure of the styles of the male subgenital plate, which are widely separated, recurved hook-like structures with a sharp apex, the margin of the subgenital plate between the styles being broadly arcuate. The supra-anal plate of the male is of a simple, broad, transverse type, with the margin relatively regularly arcuate. The structure of the male genitalia readily distinguishes this species from the allied forms. Some comparative notes on the female subgenital plate of the species are given under *detersa*.

TYPE.—Male; Cuba. (Ch. Wright.) [Museum of Comparative Zoölogy.]

Size large (for the group, of which it is one of the largest species); form as usual in the genus, depressed; surface moderately polished.

Head of type badly damaged,⁴ of paratypes, narrowly projecting cephalad of pronotum, occipital outline with eyes weakly arcuate, with occipital interspace between eyes slightly narrower than supra-ocular depth of eye, nearly twice as wide as that between ocellar spots. Lateral costæ of head ventro-caudad of eyes faintly convergent, nearly parallel. Palpi relatively slender; third joint straight, subequal; fourth joint slightly shorter than the third joint, weakly infundibuliform; fifth joint slightly shorter than the fourth, moderately inflated, subdepressed, the apex rounded from the dorsum, moderately acute when seen from side. Eyes weakly projecting laterad, in basal outline broad subreniform, narrowed ventro-caudad. Antennæ elongate; proximal joint large, moderately inflated; third joint elongate, but little shorter than proximal joint.

Pronotum short sub-trapeziform ovate, moderately transverse, the greatest length contained one and three-tenth times in the greatest width, the axis of the latter appreciably caudad of middle of pronotum; cephalic margin of pronotum moderately arcuate, regularly passing laterad into the oblique, caudad diverging, weakly arcuate lateral margins, the point of greatest width strongly and regularly rounding to the caudo-lateral angles, which are evident but slight; caudal margin of pronotum weakly and very broadly angulate arcuate. Surface of disk of pronotum without oblique impressions; lateral portions broad, appreciably but not strongly deflexed, the disk very weakly arcuate in transverse section.

Tegmina elongate lanceolate, surpassing the apex of abdomen by the length of pronotum, greatest width contained slightly more than three and one-third times in greatest length of same, in general subequal in width: costal margin well arcuate

¹The Blanton Copper Mine is very near Naranja Dulce and in the hills called "San Francisco Mountains" by Busck.

²Bent inwards, in allusion to the styles.

³This is probably the species recorded by Bolivar (1887, Mém. Soc. Zool. France, I, p. 123) as *Blatta adpersicollis*, from Guantanamo. This latter is a South American species, and does not, as far as we know, occur in the West Indies.

⁴The type, the only male available when the description and figures were prepared, is badly damaged, lacking most of the head, cerci and most of the legs. Where we are unable to give features of these parts from the type, we are giving those found in the paratype males from Cotorro, Cuba.

proximad, nearly straight in greater part of the region of the scapular field, distad rather strongly rounding to the slightly obtuse, but very evident, apex, which is but faintly rounded and is slightly nearer the costal than the sutural margin; sutural margin largely straight, distad broadly rounding to the apex. Marginal field of tegmen moderately broad, elongate; scapular field relatively broad, greatest width one-half that of tegmen at point in line with apex of anal field, narrowing appreciably distad; anal field very elongate pyriform, the apex not appreciably blunted, costal veins of tegmina strongly longitudinally oblique, diverging from the discoidal vein at very acute angles, a number of those distad are bifurcate; discoidal sectors longitudinal, ten to twelve in number including ulnar vein and the longer furcations of some of the ulnar rami; axillary veins of tegmina six in number. Wing with apex rounded acute-angulate: costal margin of wing with region of the costal vein very faintly arcuate; intercalated triangle distinct but small. Costal veins of wing, including mediastine vein, ten to eleven in number, strongly oblique, the proximal five or six very elongate clavate briefly before apex: medio-discoidal area virtually subequal in width to medio-ulnar area, former with numerous transverse cross-veins forming oblong or quadrate areolets: ulnar vein with four to five complete rami, several of which are bifurcate; axillary vein with three rami diverging on the side toward the anal vein, the two longer ones bifurcate.

Dorsum of abdomen unspecialized.¹ Supra-anal plate transverse, arcuate sub-trigonal, cercal emargination marked, surface largely deplanate, lateral portions of margins weakly elevated. Cerci damaged. Subgenital plate complex, moderately transverse, the plate proper embracing the bases of the processes laterad, surface moderately elevated or impressed with a slight, lip-like recurvature of the margin meso-distad; distal margin much like that of supra-anal plate in shape, with a weak median thickening and labiation: styles lateral, briefly mesad of the accessory processes in position, depressed and lying subparallel to the general plane of the plate, diverging, short, the tip bearing a strong spine: accessory processes placed in the distinct lateral embrasures of the margin of the plate, developed as hinged, mesad directed, sigmoid and strongly recurved hooks, in their length subequal to one-third the length of plate between their bases, very thick proximad, with a flange-like carina, narrowing distad and with the distal recurvature pronounced and with a decided apical claw-like spine, the whole structure exhibiting considerable tortion.

Cephalic femora with ventro-cephalic margin bearing "Type A" spination, the spines all being equal in form and relatively large, but decreasing in size distad, the proximal ones quite long; apical group of large spines on same margin two in number, the distal the longer: ventro-caudal margin with four spines in distal two-thirds. Median and caudal femora each with dorso-genicular spines; ventral margins well spined; caudal tibiae elongate. Caudal tarsi very slender and elongate: caudal metatarsus equal to five-eighths of entire tarsal length; ventral surface of caudal metatarsus and second and third joints biserial spinose; pulvilli on all tarsal joints except apical one, distal, trigonal and relatively small on all but fourth, on which the pulvillus takes up all the ventral surface; arolia present; tarsal claws with lamella serrulate on margin.

¹This surface is considerably damaged, and of the median segment largely destroyed, in the type male. The male paratypes are appreciably shrivelled, but no pronounced specialization is evident.

ALLOTYPE.—Female; Baños de San Vicente, seven kilometers north of Viñales, Province of Pinar del Río, Cuba. September 16–22, 1913. (Lutz; on bananas.) [American Museum of Natural History.]

Differing from the type in the following features.¹

Head with least occipital interspace between eyes relatively narrow, not greater than the occipital dorso-ventral depth of eye, the interocular width one and one-half times that between eyes.

Supra-anal plate transverse trigonal, the lateral portions of the margin weakly arcuate-emarginate, the apex of the plate arcuate with a sharply-cut V-shaped fission. Cerci damaged and incomplete. Subgenital plate large, moderately compressed and subrostrate distad, moderately produced and narrowing from the cercal emarginations, which are slight, the apex narrowly subtruncate; ventral surface of distal section of plate without a median sulcus.

General dorsal coloration pale raw sienna, on the dorsum of the abdomen passing to antimony yellow with the tergites margined distad and disto-laterad with fuscous, this most decided on distal half of abdomen, the supra-anal plate also largely and the cercal bases considerably fuscous. Ventral surface and limbs largely antimony yellow; ventral surface of the abdomen, in the male, laterad with areas of weak fuscous and more distinct, but smaller, gland spot patches, also an irregularly defined but extensive washing of the subgenital plate with mummy brown. Interocular and interocular region with a large auburn patch, which has a spot of the general face color in its center and which may extend over the occiput in four fine dotted lines, the central pair closely placed, the others laterad: eyes bister: palpi with five joints weakly washed with fuscous: antennæ washed with vandyke brown, strongly so distad, the proximal and third joint blotched with same. Pronotum with disk opaque raw sienna with a pattern of fuscous dots; one pair caudo-mesad, a median pair of irregular figures made up by fusion of spots of about three parts each, paired small spots each placed at external borders of disk and a similar pair placed cephalad of the irregular figures: lateral portions of pronotum semi-transparent. Tegmina with marginal field slightly more clear hyaline than remainder of tegmina. Wings with veins pencilled in bister, the enlarged portions of costal veins approaching vinaceous-rufous. Tibiæ with extensor surface much marked with mummy brown, heavier distad; femora with similar markings pronounced on ventral margins of caudal femora and less extensive but evident on median femora, the markings placed mainly at spine bases.

Male (type).—Length of body, 13.7 mm. (head lacking); length of pronotum, 3.5; greatest width of pronotum, 4.6; length of tegmen, 15.2; greatest width of tegmen, 4.5.

Female (allotype).—Length of body, 13.5 mm.; length of pronotum, 3.9; greatest width of pronotum, 5; length of tegmen (damaged, with apex incomplete); greatest width of tegmen, 4.5.

In addition to the type and allotype we have before us two male and one female paratypes, taken at Cotorro, Havana Province, Cuba, by José Cabrera, and from the collection of the Academy of Natural Sciences of Philadelphia. These specimens were received subsequent to the preparation of the description and figures of this species, and in consequence

¹Certain parts of the body, which are lacking or damaged in the male type, are here described as seen in the female.

we have used them merely to elaborate the descriptions already prepared. No essential differences from the described specimens have been noted in the Cotorro individuals.

***Neoblattella eurydice*,¹ new species**

Plate IV, Figures 1 to 4

This relatively large species possesses a markedly distinctive male subgenital plate, the distal margin of which is transversely truncate with a median trigonal production, the styles placed in the lateral terminations of converging stylar grooves. The interocular space is narrow in the male sex, distinctly narrower than the occipital depth of the eye, and that area and the interocellar and interantennal region has no decided markings, but is washed with rufescent.

TYPE.—Male; between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. Elevation, 4400–4780 feet. July 24, 1923. (Rehn; from bromeliads.) [Academy of Natural Sciences of Philadelphia, Type No. 5409.]

Size medium (for genus); form and surface as usual in genus.

Head, when viewed from dorsum, visible cephalad of pronotum for nearly the full width of the head; seen in cephalic aspect, subpyriform in outline, slightly deeper than greatest width across eye: interspace between eyes narrow, not more than two-thirds as great as occipital depth of eye; interspace between ocellar spots slightly more than twice as great as interocular space. Palpi moderately elongate, ultimate joint slightly more than three-fifths as long as penultimate joint, latter appreciably infundibuliform, faintly sinuate proximad, antepenultimate joint slightly longer than penultimate joint, faintly sinuate.

Pronotum of the type usual in genus, ovoid-trapezoidal in outline, point of greatest width moderately caudad of middle, greatest length contained about one and two-fifths times in greatest pronotal width; lateral hyaline areas broad, moderately deflexed.

Tegmina and wings very ample, surpassing apex of abdomen by nearly twice the pronotal length: tegmina with marginal field relatively broad; scapular field very broad, at middle of tegmen occupying fully one-half of entire tegminal width; anal field elongate pyriform, with six to seven axillary veins.

Supra-anal plate of male transverse, arcuato-trigonal, apex very faintly emarginate. Subgenital plate in general form roughly transverse quadrate, lateral borders of plate, as seen from venter, subparallel, lateral portions of plate incurved dorsad of stylar sockets and not evident from venter; distal margin as a whole transversely truncate with a median trigonal production, which occupies about one-third of entire width of distal margin, laterad this margin is obliquely emarginate to base of styles; ventral surface of plate shallowly concave mesad, elevating laterad to the stylar bases, where a series of chætæ are distributed on ventral and external margins of sockets; extending mesad across ventral face of plate from stylar sockets proximad of and ventrad of the truncate and trigonal sections of distal margin is situated a pair of stylar grooves or channels, deepest laterad, becoming narrower and shallower toward median line; dorsal surface of trigonal section of distal margin with several short but evident conical teeth near apex; styles elongate, equal to one-half distance between

¹From *Eurydice*'s sojourn in *Hades*, in allusion to these insects hiding in the dark recesses of bromeliad clusters.

their bases, tapering, subcompressed proximad, virtually subequal in width in distal third, faintly bent-arcuate slightly proximad of middle, apex with a group of pronounced chaetæ.

Caudal tibiæ very elongate, metatarsus a third longer than the remaining tarsal joints together; metatarsus, except for dorsum of proximal section, and second and third tarsal joints appreciably compressed, biserially spinose ventral surface of metatarsus and of second tarsal joints very narrow. Tarsal claws ventrad with a marked pre-apical notch, marginal denticulations pronounced, increasing in size distad to notch.

ALLOTYPE.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

Differing from the above description of the male (type) in the following noteworthy features.

Interspace between eyes broader, subequal to occipital depth of eye; interspace between ocellar spots equal to one and one-half time interocular space.

Tegmina and wings surpassing apex of abdomen by a distance about equal to length of pronotum.

Supra-anal plate trigonal in form, apex with a small, circular emargination, which is broader at its middle than the marginal aperture. Subgenital plate large, moderately compressed rostrate distad, infracercal sections of sides of plate appreciably inbent; lateral margins distinctly cingulate from base to half-way between cercus and apex; ventral surface of distal section subdeplanate with indications of a medio-longitudinal sulcation in that area; apex relatively narrow, faintly arcuato-emarginate.

General base color clear ochraceous-buff, pronotal disk with base color more cinnamon-buff. Occiput, interocular space and inter-ocellar region unmarked cinnamon-rufous, gradually passing ventrad into the base color of the face; eyes mummy brown to fuscous. Pronotal disk with an indefinite pattern represented by a pair of closely placed mummy brown small dots caudad; a median, less definite pair of more widely separated, generally larger spots and a pair of nebulous, similarly tinted areas cephalad, which latter may be subobsolete: caudal margin of pronotum pencilled with vinaceous-rufous, of variable intensity. Marginal field and portion of scapular field of tegmina, and lateral areas of pronotum, hyaline: proximal section of humeral trunk and of mediastine vein lined with vinaceous-rufous, variable in intensity. Venter of male sometimes faintly washed distad with cinnamon-rufous (type), in that sex with a fine medio-longitudinal mummy brown line on proximal segments and less definite lateral marginal darkening on all segments; in female similar dark markings are indicated, median less evident, lateral subobsolete proximad but becoming decided distad and more than distal half of subgenital plate nearly solidly dark mummy brown. Cerci transversely barred on ventral surface of each joint with mummy brown. Femora frequently washed with cinnamon-rufous proximad; vicinity of spine bases on cephalic femora and on median and caudal femora, also the ventral margins, very largely marked with mummy brown.

Male (type).—Length of body, 13 mm.; length of pronotum, 3.4; greatest width of pronotum, 4.5¹; length of tegmen, 16.2; greatest of tegmen, 5.

Female (allotype).—Length of body, 14.7 mm.; length of pronotum, 3.8; greatest width of pronotum, 5; length of tegmen, 15; greatest width of tegmen, 4.3.

¹The type has one side of the pronotum damaged, and this dimension is from the paratypic male which is of similar bulk.

We have before us in addition to the type and allotype, a male bearing the same data as these, and a female from the same locality and environment but taken July 22, 1923; these additional specimens we consider paratypes. Two females taken by Max Kisliuk, May 8, 1922, from the fruit steamer 'St. Mary,' at Philadelphia, in from Bowden, Jamaica, we are referring provisionally to *eurydice*. The exact locality for the latter material is, of course, uncertain. These two specimens show no noteworthy differences from the typical series except that the interocular region has a bar of rufescent brown, which is unindicated in the typical material. Without accompanying males we would prefer to place this material here as provisionally associated.

Seven immature individuals clearly referable to this species are before us, all taken by Rehn in the Blue Mountains. These are one male, same data as type; one male and two females, Morces Gap, 4980 feet, July 29 and 30, 1923; one male, one female, New Haven Gap, 5600 feet, July 26, 1923; one female, west slope of Sir John Peter Grant Peak, 5700 feet, July 26, 1923. Of these all except two from Morces Gap, taken July 29, are in the instar preceding maturity, these exceptions being in the second one preceding maturity.

This information gives the species a vertical range of from at least 4400 feet to 5700 feet.

The Blue Mountains series was taken from bromeliads in the mountain forest, those secured on July 24 all being from bromeliads on several trees at the junction of the Pleasant Hill and Clydesdale-Cinchona trails. Individuals were moderately active, but not as much so as those of *detersa* and *semota*. They hid quite deeply in the bromeliads and were dislodged only by most vigorous shaking of the detached plant in the beating net.

***Neoblattella proserpina*,¹ new species**

Plate IV, Figures 5 to 6

A species of rather large size and distinctive appearance, related on one hand to *eurydice* and on the other to *celeripes*, *tridens* and *detersa*, probably somewhat more closely allied to the first mentioned species than to the others. The heavy build, tegmina hardly (♀) or but little (♂) surpassing the apex of the abdomen, and the male genitalia are sufficiently diagnostic to assure ready recognition of the species. The subgenital plate of the male shares certain features with *eurydice*, i. e., the general contour of the ventral surface, the character of the styles, and the trigonal median production of the distal margin of the plate. The latter margin, however, shows marked differences in that the median production is subrostrate, weakly decurved and

¹Proserpina, queen of the lower world, in allusion to the secretive habits of these bromeliadiculous insects.

its margins have spaced spines; while the lateral sections of the distal margin are moderately produced and rounded, with spination as on the median production.

TYPE.—Male; between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. Elevation, 4400–4780 feet. July 24, 1923. (Rehn; from bromeliads.) [Academy of Natural Sciences of Philadelphia, Type No. 5411.]

Size moderately large (i. e., body bulk); form apparently robust, but this is due to tegminal proportions; surface polished, with tegminal venation less elevated than in other species of the *Detersa* Group.

Head almost completely hidden beneath pronotum, at most but very slightly visible cephalad of pronotum when seen from dorsum; in cephalic aspect the outline of head is pyriform, slightly wider across eyes than deep: occipital interspace between eyes with its least width subequal to occipital depth of eye; interspace between ocellar spots about one and one-half times the interocular space. Palpi as in *N. eurydice*.

Pronotum more rectangular trapezoidal than in *N. eurydice*; greatest length equal to four-fifths of greatest width, which is faintly caudad of caudal third: cephalic margin weakly arcuate, laterad regularly passing into the gently arcuate and moderately oblique lateral margins, which diverge less decidedly caudad to point of greatest width than in *N. eurydice*; caudo-lateral angles broadly rounded; caudal margin transverse, subtruncate, very faintly and broadly concave laterad of a but slightly more evident median production; in transverse section pronotum is more vaulted than in *N. eurydice*, lateral portions somewhat more declivent.

Tegmina and wings surpassing apex of abdomen by a distance equal to less than half of pronotal length. Greatest width of tegmen at middle, equal to about one-third of length of same: costal margin regularly arcuate; sutural margin in general straight, apex narrowed and rounded: marginal field broad, relatively short, at least as far as its more ample section is concerned; scapular field very broad, at middle of tegmen occupying faintly more than half of tegminal width; anal sulcus reaching to middle of tegmen, anal field elongate pyriform: venation of tegmina evident but less indicated by surface contour than in most species of the genus; discoidal sectors proportionately fewer than usual, the discoidal field being relatively restricted, about seven in number; axillary veins five to six in number.

Supra-anal plate of male transverse, distal margin regularly arcuate, no median emargination. Subgenital plate of male with general structure, form and contour very similar to that of *N. eurydice*, distal margin with a very pronounced median trigonal production and a pair of lateral, much lower, roundly obtuse-angulate shoulders; median production subrostrate, weakly decurved distad, its dorsal surface and lateral margins with distinct, spaced spines; lateral shoulders with similar spaced spines on dorsal surface and margin, those on latter recurved toward median line; styles much as in *N. eurydice*; stylar grooves of ventral surface less sharply marked.

Limbs robust, the tarsi particularly heavier and deeper than in *N. eurydice*; caudal metatarsus about a fifth longer than remaining tarsal joints. Tarsal claw specialization as in *N. eurydice*.

ALLOTYPE.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

Differing from the above description of the male (type) in the following noteworthy features.

Interspace between eyes broader, about one and one-fifth times as wide as occipital depth of eye; interspace between ocellar spots equal to one and three-fifths times the interocular space.

Pronotum faintly larger in proportion; caudal margin mesad more truly truncate. Tegmina and wings hardly surpassing apex of abdomen.

Supra-anal plate of female as in *N. eurydice*. Subgenital plate of female large, in general outline trigonal, but little compressed and very weakly rostrate distad, infra-cercal emarginations very weak, cingulation of lateral margins indicated but not pronounced from bases to shortly proximad of apex, latter narrowly rounded, entire, no disto-ventral sulcation.

General base color ochraceous-buff to dull zinc orange, hyaline lateral portions of pronotum, marginal field and adjacent scapular region of tegmina tinted with ochraceous. Occiput washed with pale orange-rufous to russet, this becoming obsolete in the inter-antennal region and with weak intimations of an enclosed transverse pale area between ocellar spots; eyes mars brown to fuscous; antennæ distad of proximal joint washed with tawny to mars brown. Pronotal disk with a pair of closely placed dark spots caudad and a median pair of more separated dots in all, in the more intensive individuals the median section has a number of extra paired dark dots, certain of which coalesce with the more persistent median pair of dots. Tegmina with proximal section of humeral trunk clouded with cinnamon-brown, in the intensive individuals the anal sulcus is pencilled with the same. Venter of abdomen colored essentially as in *N. eurydice*. Limb coloration much as in same species, varying in evidence with degree of pattern depth.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Between Pleasant Hill and St. Helens Gap, Jamaica, type...	13.8	4	5	12.2	3.8 mm.
♂, Between Pleasant Hill and St. Helens Gap, Jamaica, paratype.....	14.5	4.1	5.5	12.6	4
♀, Between Pleasant Hill and St. Helens Gap, Jamaica, allotype.....	15	4.4	5.6	12	3.8
♀, Morces Gap, Jamaica, paratype....	13.9	3.9	5.1	11.4	3.6

There is but little size variation in the adults before us, the specimens measured above representing the extremes of the series.

In addition to the type and allotype we have before us seven adults and three immature specimens from the same region, all taken by the senior author. These are as follows.

Between Pleasant Hill and St. Helens Gap, 4400-4780 feet, July 22 and 23, 1923, two males. Morces Gap, 4980 feet, July 19, 29 and 30, 1923, two males, three females, two immature males and one immature female. The adult specimens we are considering paratypes.

The species is quite uniform in character, except for a few features. The male supra-anal plate may be broadly and very shallowly emarginate distad; the male subgenital plate may show some variation in the exact shape of the lateral productions of the distal margin; the tegmina and wings in the female may fall faintly short of reaching the apex of the abdomen; the coloration may by a more intensive condition acquire an extra number of punctulations on the pronotal disk.

All of the specimens secured were taken from epiphytic bromeliads in the mountain forest, except one male from Morces Gap, taken July 30, which was found hiding under the bark of a huckleberry tree (*Vaccinium meridionale*). In the bromeliads it occurred in company with *N. eurydice* and *dryas*, here described. The type and allotype were secured from the same bromeliads which yielded the type and allotype of *N. eurydice*, on trees at the junction of the Pleasant Hill and Clydesdale-Cinchona trails.

***Neoblattella celeripes*,¹ new species**

Plate IV, Figures 8 to 9

A near relative of *N. detersa*, but of larger size, with a distinctly patterned interocular and interocellar region, also having the male subgenital plate transversely truncate distad with a narrow, digitiform median production, which lacks the shagreenous spine covering of the process found in *detersa*, while the position of the styles, their general form, the form of the distal margin and the sculpture of the venter of the plate suggest *N. eurydice* and *proserpina*, but from which the form of the production is a decided departure. Comparison is made with *N. tridens* under that species.

TYPE.—Male; taken from S. S. 'St. Mary,' at Philadelphia, with fruit from Bowden, Jamaica.² May 8, 1922. (M. Kisliuk.) [Academy of Natural Sciences of Philadelphia, Type No. 5412.]

Size medium (for genus); form and surface as in *N. eurydice* and other allies.

Head when seen from dorsum narrowly visible cephalad of pronotum for greater portion of head width; seen in cephalic aspect pyriform as in allies, slightly deeper than greatest width across eyes; occipital interspace between eyes relatively narrow, but slightly greater than half of occipital depth of eye. Palpi less elongate than in *N. eurydice* and *proserpina*, penultimate and antepenultimate joints less elongate, ultimate joint three-fourths as long as penultimate.

¹In allusion to the swiftness of foot of the species of this group.

²We cannot give more definitely the source of the fruit in which this material was sheltered. It is very probable, however, that it was raised in the territory within a reasonable radius of Morant Bay, on which Bowden is situated. We may tentatively consider this species one of the lower country of south-eastern Jamaica, i.e., that portion along the south coast east of Kingston.

Pronotum essentially as in *N. eurydice*. Tegmina and wings very ample, surpassing apex of abdomen by nearly twice the pronotal length; tegminal character as in *N. eurydice*.

Supra-anal plate of male much as in *N. eurydice*. Subgenital plate of male in general form roughly transverse rectangulate; lateral sections of plate vertical, rounding into ventral surface of plate, caudal margin of lateral sections obliquely truncate to base of style; distal margin of plate transversely subtruncate, lateral angles rather abruptly arcuate rectangulate to dorsal portion of stylar fossæ; median production of distal margin digitiform, narrow, subequal in width, not decurved distad, its dorsal surface arcuate distad when seen in profile, a few scattered spines disto-dorsad but no shagreenous covering indicated; lateral angles of distal margin with a few scattered teeth: ventral surface of plate with its general contour much as in *N. eurydice*, stylar grooves evident, converging, placed near distal margin: styles much as in *eurydice* but somewhat slenderer, more decurved distad.

Caudal tibiæ moderately elongate, somewhat less compressed than in *N. eurydice*; metatarsus nearly twice as long as remaining tarsal joints together, biserially spinose, ventral surface of metatarsus slightly wider than in *N. eurydice*. Tarsal claws as in latter species.

ALLOTYPE.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

Differing from the male description in the following noteworthy features.

Slightly larger in general size.

Interspace between eyes (occipital) subequal to occipital depth of eye.

Supra-anal plate of female trigonal, supra-cercal emarginations evident and arcuate, distal extremity with a small and narrow, but relatively deep, U-shaped emargination. Subgenital plate of the type usual in the sex in this genus, weakly compressed in distal third, distal section or apex of ventral surface distinctly though rather briefly sulcate, apical margin hardly emarginate when seen in direct ventral aspect.

General color as in *N. eurydice*. Interocular region with a transverse bar of russet (♀) to mummy brown, becoming obsolete and evanescent toward the occiput, much more sharply defined ventrad; ocellar spots surrounded by russet (♀) to mars brown (♂), which color forms a distinct but not sharply defined bar across the upper face between the ocellar spots and separated from the interocular bar by a transverse area of the pale base color; eyes russet to mummy brown. Pronotal disk with the usual closely placed caudal pair of dark dots and more distant median pair, and an associated pair of cephalic dashes and caudal dots, the more nebulous dots and clouds are indicated cephalad on the disk and caudo-laterad of the median dots. Tegmina and wings colored as usual in group. Venter of abdomen of male colored much as in *N. eurydice*, but with lateral dark bars intermarginal and more prominent than median bar, which latter reaches caudad only to antepenultimate sternite, apical cinnamon-rufous wash marked; in female colored much as in *N. eurydice* but lateral dark bars broader, and the suffused section of the subgenital plate has much of its median portion distinctly ferruginous. Cerci colored as in *eurydice*. Femora and tibiæ with area about spine bases and adjacent margins washed with mummy brown.

Type.—Length of body, 12.8 mm.; length of pronotum, 3.2; greatest width of pronotum, 4.4; length of tegmen, 14.5; greatest width of tegmen, 4.

Allotype.—Length of body, 13.3 mm.; length of pronotum, 3.7; greatest width of pronotum, 5; length of tegmen, 16; greatest width of tegmen, 4.4.

The type and allotype are the only individuals of this species we have seen. It is unfortunate we have no material from Jamaica with exact information, but the species is so distinctive in the genitalic features of the male, its description, as is also the case with *N. tridens*, must be presented to complete the known forms of West Indian Blattidæ.

***Neoblattella tridens*, new species**

Plate IV, Figures 10 to 11

A species which in general appearance is very similiar to *N. celeripes*, but having the distal margin of the male subgenital plate tridentate, by marked diverging peg-like productions of the caudo-lateral angles as well as a pronounced median production. This margin suggests somewhat the structure found in *proserpina*, but the productions are all peg-like and narrow, and not trigonal as in the latter species, while many features of the general form are different.

TYPE.—Male; taken from S. S. 'St. Mary,' at Philadelphia, with fruit from Bowden, Jamaica.¹ May 8, 1922. (M. Kisliuk.) [Academy of Natural Sciences of Philadelphia, Type No. 5413.]

Size, general form, and surface as in *N. celeripes*.

Head much as in *N. celeripes*; occipital interspace slightly greater than in *celeripes*, in type four-fifths as great as occipital depth of eye. Palpi intermediate between those of *eurydice* and *celeripes* in length.

Pronotum essentially as in *N. eurydice* and *N. celeripes*. Tegmina and wings surpassing apex of abdomen by slightly more than the pronotal length; tegminal character as in *N. eurydice* and *celeripes*.

Supra-anal plate transverse trigonal, apex very shallowly concave. Subgenital plate basically as in *N. celeripes* but median digitiform production more delicate and less pronounced, while caudo-laterad the distal margin of plate develops diverging peg-like processes, which are about as long as but broader than median production, these lateral productions may (type) or may not vary in relative width, their distal margin and dorsal surface with spaced spiniform teeth: styles as in *N. celeripes*.

Limbs as in *N. celeripes*.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, type.....	13.5	3.5	4.8	15.8	4 mm.
♂, from S. S. 'Runa,' paratype.....	11.2	3.3	4.5	14.6	4
♂, from S. S. 'Runa,' paratype.....	12.7	3.4	4.6	15.5	4

¹Our comments on the actual origin of this material would be somewhat different from those made under *N. celeripes* (see footnote 2, page 71), some of the material of *tridens* examined by us probably having been from the north coast of Jamaica, as the ship bearing it cleared from Port Antonio. In consequence we cannot hazard a suggestion as to the probable habitat area of the species, except that it is a native of the lower country of Jamaica where bananas are cultivated.

Coloration as in *N. celeripes* with the following exceptions. Interocular occipital dark bar slightly more extensive ventrad; interocellar dark bar broken mesad, where the ends of the lateral halves are somewhat broadened. Apex of venter of abdomen less distinctly rufescent; ventral median dark line usually more extensive, generally reaching to ultimate sternite, but occasionally not reaching distad of the antepenultimate one; lateral dark ventral bars somewhat broader.

In addition to the type we have before us six male paratypes, all taken from fruit steamers at Philadelphia. One bears the same data as the type, while the remaining five were taken in 1922 by M. Kisliuk, from the S. S. 'Runa,' in from Port Antonio, Jamaica. These specimens show no noteworthy differences not mentioned above, while the size varies slightly as the above table of measurements shows.

***Neoblattella detersa* (Walker)¹**

Plates IV, Figure 7; VI, Figures 7 to 10

Blatta detersa WALKER, 1868, 'Catal. Blatt. Brit. Mus.', p. 215. ♀; Jamaica.

JAMAICA.—Montego Bay, St. James Parish, III, 4, 1911, (J. Grossbeck; under dried cocoanut palm leaves), 1 ♂; X, 28, XI, 2, 1913, (M. Hebard; in dried leaves under acacias on hillside and in débris near beach), 1 ♂, 2 ♀, [Hebard Cln.]. Palm Beach, Montego Bay, III, 3, 1911, (J. Grossbeck; under stones on coral rock), 1 ♀. Dunrobin District, Mandeville, Manchester Parish, 2350 feet, XI, 29, 1919, (F. E. Watson; taken by sweeping), 1 ♀. Near Bog Walk, Rio Cobre, St. Catherine Parish, X, 25, 1913, (M. Hebard; in leaf mould under dense brush on hillside), 1 immat. ♂, [Hebard Cln.]. Stony Hill, St. Andrew Parish, X, 25, 1913, (M. Hebard; in dead leaves under dense brush on hillside), 2 ♂, 3 ♀, 1 immat. ♂, 2 immat. ♀, [Hebard Cln.]. Ferry River, near Kingston, VII, 5, 1920, (R. and H.; in short grass under dead cocoanut petioles in open spots), 1 ♂, 1 immat. ♀, [A. N. S. P.]. Kingston, St. Andrew Parish, X, 24, 1913, (M. Hebard; in débris near beach), 1 ♂, 1 ♀, [Hebard Cln.]. Constant Spring, St. Andrew Parish, 650 feet, I, 4–24, 1920, (H. E. Machado), 1 ♂. Pleasant Hill, Blue Mountains, 3800 feet, VII, 24, 1923, (Rehn; from under bracts of banana blossoms), 1 ♂, [A. N. S. P.]. Jamaica [no exact locality], (C. W. Johnson), 1 ♂, [A. N. S. P.].

HISPANIOLA.—Haiti [no exact locality], 1 ♂, 1 ♀, [Museum of Comparative Zoölogy].

While there is a certain amount of uncertainty in genera as difficult as *Neoblattella*, in the recognition of species based upon the female sex, we feel convinced of the correctness of our association of Walker's *detersa*.

¹In part *azteca* of Rehn (not of Saussure and Zehntner, 1893), 1903, Trans. Amer. Entom. Soc., XXIX, p. 268.

Uvarov has compared a female of the species here reported with the type of *detersa*, and he states they are the same. In the original, and otherwise very vague, description certain colorational features are mentioned, combined with size, which also point to this species of those known from the type locality.

The ulnar vein of the wing has from three to five rami, while the paired dark ventro-lateral abdominal bars, mentioned in the description, are variable in depth, in the Kingston female being much reduced in width and depth of tone, in the Palm Beach female subobsolete. The punctulation of the pronotal disk is variable in degree, one extreme having not more than three pairs of blackish points on a pale ochraceous ground, the other having a relatively complex pattern of blackish points and curved dashes on a ground varying from pale ochraceous to pale tawny. In size there is considerable variation, the extremes of the series measuring (in millimeters) as follows.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♂, Haiti.....	9.5	3	4.1	12 mm.
♂, Stony Hill, Jamaica.....	11	3.2	4.4	14
♀, Montego Bay, Jamaica.....	10.7	3	4	10.3
♀, Palm Beach, Jamaica.....	11.6	3.5	4.5	13.3

Both of the Haitian individuals are smaller than the average of the Jamaican specimens.

The palpi are here figured, as well as the genitalic features of both sexes. The interocular space in the male specimens shows a very decided amount of variation, ranging from less than one-third of to subequal to the occipital depth of eye. This variation is not correlated with fluctuations in the male genitalic features and the extremes are found in the Jamaican series.

The male genitalic features may be briefly characterized as follows.

Supra-anal plate strongly transverse, broadly trigonal, the lateral portions of the margin straight oblique from the cercal flexures, apex rather broadly and rather shallowly arcuate-emarginate: cerci elongate, tapering, attenuate distad and with apex moderately acute, segments moniliform, depressed dorsad, segments individually rounded ventrad: subgenital plate moderately transverse, lateral portions reflexed and vertical; distal margin from bases of styles obtuse-angulate, with a decided, rostrate process, which is arcuate dorsad and decurved and weakly bulbous at the apex, the dorsal surface of the apex of the process clothed with moderately adpressed,

hooked teeth, the process varying greatly in width and somewhat in length, ranging from broad, linguiform, subdepressed, with broadly arcuate (transversely) distal margin (Plate IV, fig. 7), to an extreme which is pinched proximo-ventrad, stiffened by lateral, diverging wings, which form erect vertical lamella on the dorsal surface of the plate, briefly within the distal margin as seen from the venter (Plate V, figs. 7 and 8); styles not reaching to the apex of the median process, rod-like, arcuate, with their tips diverging.

The important female genitalic features are as follows.

Supra-anal plate transverse trigonal, slightly more longitudinal than in male; distal margin with lateral portions very weakly arcuate-emarginate; apex with a distinct, but not extensive, semi-elliptical emargination: subgenital plate large, weakly rostrate distad, the distal margin with its lateral portions slightly acute convergent and straight, apex narrowly truncate to subemarginate, ventral surface of apex appreciably but not decidedly medio-longitudinally sulcate.

The extremes of development of the median process of the distal margin of the male subgenital plate are found in material from the same section of Jamaica, from points as little distant as Stony Hill and Constant Spring, which are separated by but little over two miles of distance and a few hundred feet of elevation. The specimen from Pleasant Hill, at 3800 feet elevation, the highest locality we have for the species, is identical in the form of the process with the specimen from the Ferry River, which is from virtually sea-level. From this it is evident there is no local or altitudinal correlation of the development of this process. The Haitian male has the process broad and short. The immature male from Stony Hill shows the beginning of the median production of the subgenital plate.

The records of this species from Southern Florida by the present authors¹ have been shown by Hebard² to refer to *Latiblattella rehni* Hebard. The present species is known only from Jamaica and Hispaniola. Apparently the species does not reach into the region of the true mountain forest, as no indication of it was seen in that area, and at Pleasant Hill, at 3800 feet, it occurred in cultivated land.

***Neoblattella semota*,³ new species**

Plate IV, Figures 12 to 16

A near relative of *N. detersa*, which is a native of the same island (Jamaica), but readily distinguishable by the more elongate form, distinctly barred interocular and interocellar regions, the non-emarginate male supra-anal plate and the greatly elongate sub-falciform median production of the male subgenital plate. The latter character alone will at once distinguish males of the two species. No close affinity exists with any of the other species of the genus here treated.

¹1914, Proc. Acad. Nat. Sci. Phila., p. 379, and 1914, Journ. N. Y. Ent. Soc., XXII, p. 98.

²1917, Mem. Amer. Ent. Soc., No. 2, p. 38.

³I. e., different, distinct.

TYPE.—Male; Pleasant Hill, Blue Mountains, Jamaica. Elevation, 3800 feet. July 28, 1923. (Rehn; among dead bracts of banana blossoms.) [Academy of Natural Sciences of Philadelphia, Type No. 5414.]

Size less than medium (for genus); form and surface as usual in group.

Head visible cephalad of pronotum when seen from dorsum for nearly entire width of head: in cephalic aspect the head outline is pyriform, greatest width across eyes about four-fifths of greatest depth of head: occipital interspace between eyes equal to about three-fourths occipital depth of eye; that between ocellar spots nearly twice as wide as that between eyes. Palpi more elongate and more slender than in *detersa*, ultimate joint proportionately shorter in relation to penultimate joint than in *detersa*.

Pronotum as in *N. detersa*. Tegmina and wings elongate, surpassing apex of abdomen by a distance equal to twice length of pronotum: marginal field narrower and more elongate than in *detersa*; discoidal field with eight sectors.

Supra-anal plate of male transverse trigonal, apex of margin arcuate, non-emarginate. Subgenital plate of the transverse rectangulate type usual in the group; distal margin with median production greatly developed, forming an elongate, falciform appendage slightly longer than median length of other portion of plate and greater than half of proximal width of same, seen from venter the production regularly narrows to its middle, thence appreciably compressed and subequal with apex narrowly rounded, in profile the production is directed dorso-caudad, very faintly deepening from middle distad, apex with scattered depressed spiniform denticulations; stylar grooves virtually forming part of the distal margin, broad but very shallow, distomesad passing into proximal portion of median production: styles much as in *N. detersa*, robust, short, converging, roughly tapering, somewhat arcuate. Cerci more slender distad, seen from venter, than in *N. detersa*, the six distal segments longer than broad.

Caudal metatarsus slightly larger in proportion than in *N. detersa*, more slender. Tarsal claws as in *N. detersa*.

ALLOTYPE.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

Differing from the above description of the male (type) in the following noteworthy features.

Interspace between eyes broader, one-fifth greater than occipital depth of eye; that between ocellar spots little more than one and two-third times interspace between eyes.

Tegmina and wings surpassing apex of abdomen by a distance equal to not more than one and one-half times pronotal length.

Supra-anal plate of female trigonal, apex narrowly U-emarginate. Subgenital plate of female of the type usual in this group of genus, appreciably rostrate, acuminate compressed distad, apical margin narrowly subtruncate, ventral surface of distal rostration shallowly but appreciably medio-longitudinally sulcate; cingulation of lateral margins becoming obsolete between infra-cercal emarginations and apex of plate.

General color tone pale cinnamon-buff to clay color, the lateral portions of the pronotum, marginal and much of the discoidal fields of the tegmina virtually clear hyaline. Interocular dark bar and a generally broken interocellar dark bar cinnamon-brown to prout's brown, the interocellar bar in form much like that found in *N. tridens*, when broken the sections are broader at the break than laterad near the ocelli.

Antennæ occasionally washed with cinnamon-brown. Eyes russet to bay and mummy brown. Disk of pronotum with its dark (cinnamon-brown to mummy brown) pattern of dots varying from a minimum of a caudad disposed and closely placed pair and a median more distant and irregularly blotch-like pair, to a more complicated pattern (well exemplified by the type) which has a cephalic pair of dots, about five additional pairs of dots mesad and several curved lines; occasionally the pronotal disk is to some extent outlined by a fine dark line. Venter of abdomen with a dark median and paired intermarginal dark prout's brown to mummy brown lateral bars, which rarely are subobsolete, the median bar broad proximad and narrow distad, generally reaching penultimate sternite, lateral bars relatively narrow but varying somewhat in width and solidity, reaching the base of the subgenital plate in the female and absent from this plate and the preceding sternite in the male. Limbs colored as usual in the group.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Pleasant Hill, Jamaica, type.....	11.5	2.8	3.8	14.7	3.7 mm.
♂, Pleasant Hill, Jamaica, paratype....	10.6	2.8	3.8	14.2	3.8
♀, Pleasant Hill, Jamaica, allotype.....	13	3.1	4.2	14.8	3.8
♀, Pleasant Hill, Jamaica, paratype...	11.9	3.2	4	14.6	3.8

In addition to the type and allotype we have before us a paratypic series of seven males and five females, all taken by the senior author at Pleasant Hill, at the same elevation and under the same conditions as the type and allotype, on dates ranging from July 21 to 28, 1923.

As the above measurements of extremes show, there is but little variation in size in either sex. The only structural feature which exhibits noteworthy variation is that the occipital interspace between the eyes in the male sex varies to a width equal to the occipital depth of the eye.

The immature males are all in the instar preceding maturity and show a well-developed predecessor of the relatively elongate median production of the adult subgenital plate. In all of them the interocular and facial pattern is distinctively characteristic and essentially as in the adult. The venter of the abdomen has the greater portion of its disk solidly infuscate and the paired longitudinal intermarginal lines are narrow and relatively weak.

This species is exceedingly active when disturbed from its favorite hiding place under the dead bracts of banana blossoms. The series was

taken by placing a heavy beating net around the blossom tip and then carefully stripping off the bracts. The cockroaches falling into the net would run about most actively, taking flight occasionally. The species was never noted at light, which would seem to indicate it is not an active night form, as Pleasant Hill House is but a few hundred yards from the small banana patches which yielded the series, and in addition to the regular lights of the house, which attracted some most interesting forms, a powerful gasolene pressure light was used a number of nights.

The female taken July 21 is teneral, which, taken with the occurrence of immature males as late as July 24, may indicate that the species was then just reaching maturity.

***Neoblattella adusta* (Caudell)**

Ischnoptera adusta CAUDELL, 1905, *Canad. Entom.*, XXXVII, p. 237. ♂; Arroyo, Porto Rico.

The present species has proved one of the most puzzling of the West Indian *Pseudomopinae*. It was evident that it was not an *Ischnoptera*, and the unique male type, now in the United States Natural Museum, was re-examined by Mr. Caudell, and finally by both of the authors before we felt sure of its association. It is clearly a very sharply defined and rather aberrant member of the *Detersa* Group, nearest to *borinquenensis* and *vomer* here described, and not at all close to *carcinus*, *vatia*, *eurydice*, *proserpina*, *celeripes*, *tridens*, *detersa* and *semota*.

From *borinquenensis* and *vomer*, *adusta* can be separated by the very different male genitalia, different proportions of the maxillary palpal joints and the different pronotal proportions. The diagnostic features of the species may thus be summarized.

Head flattened; interocular space broad, slightly narrower than distance between antennal sockets. Palpi with third and fourth joints very elongate and slender. Pronotum very weakly transverse, subtrapeziform. Ventro-cephalic margin of cephalic femora with "Type A" spination; apical spines on same margin two in number. Three proximal tarsal joints with very small distal pulvilli; small fourth joint with ventral surface completely occupied by a pulvillus. Well-developed arolia present. Tegmina elongate, with eight longitudinal discoidal sectors; anal field quite long. Wings with costal veins very slightly enlarged distad; ulnar vein quadrimargose, two of these bifurcate.

Dorsal surface of abdomen of male not specialized. Supra-anal plate of male simple, transverse, distal margin very broadly obtuse-angulate; cerci strongly tapering distad. Subgenital plate of male very complex, transverse trapeziform when seen from venter, lateral portions bent dorsad, the whole rather scoop-shaped; distal margin unarmed, not thickened, obtuse-angulate mesad when seen from venter, U-emarginate when seen in caudal aspect; lateral margins of plate proximad unarmed,

raised, distad these margins are raised, thickly supplied with stout chitinous spinulæ: styles inserted in deep incisions in the lateral margins, rod-like, surpassing the distal margin of the plate, armed on their disto-internal face with fine denticulations. Genital hook simple.

This species may be the one referred to by Gundlach as *Blatta vitrea*,¹ from Porto Rico without exact locality, or by the same author as the manuscript *Blatta caraibea*,² from houses in Mayaguez. The two following species, i. e., *borinquenensis* and *vomer*, may with equal propriety be the ones referred to in these unassignable records of Gundlach.

The type of this species was taken at light, February, 1899, at Arroyo, Department of Guayama, Porto Rico. The species has not been recorded since the original description.

***Neoblattella borinquenensis*,³ new species**

Plate V, Figures 11 to 13

A member of the *Detersa* Group of the genus and a relative of *adusta* (Caudell), from Porto Rico, but readily separable from this, as well as the other members of the group, by the distinctive male genital features, particularly the form of the subgenital plate. In the female sex we find the head slightly less depressed, the eyes deeper, the interspace between the same much greater and the pronotum more rounded than in *detersa*, while the subgenital plate is non-sulcate distad on ventral surface as in *vatia*.

TYPE.—Male; El Yunque, Department of Humacao, Porto Rico. Elevation, 800 feet. (C. W. Richmond.) [United States National Museum.]

Size medium (for the genus); form and surface as usual in the group.

Head narrowly visible cephalad of the pronotum: occipital line nearly straight; least interspace between eyes subequal to the occipital depth of eye, the occiput broadening dorso-caudad; interocellar width slightly greater than the least interocular width; ocelli of medium size, slightly prominent, subovate in outline, with their axes oblique: face not appreciably deplanate; lateral margins of face briefly ventrad of eyes straight, moderately converging ventro-caudad. Palpi very elongate, extremely slender; third joint nearly straight, cylindrical; fourth joint subequal in length to third, weakly but regularly infundibuliform; fifth joint about three-fifths the length of fourth joint, lanceolate, weakly inflated, apex blunted acuminate. Eyes slightly prominent, reniform in outline, broad toward the occiput, narrowing caudo-ventrad. Antennæ surpassing the body in length; proximal joint large.

Pronotum transverse, trapeziform subovate, greatest length contained one and two-fifths times in greatest width, the latter slightly caudad of the middle; cephalic margin of medium width, truncato-arcuate, appreciably rounding into the truncato-arcuate cephalic section of the lateral margins, which broadly round at the lateral angles into the short, converging truncato-arcuate section; latero-caudal angles

¹1887, Anal. Soc. Españ. Hist. Nat., XVI, p. 141.

²Idem, p. 141.

³This is the species reported by Rehn on the basis of the female sex alone, from Utuado, Department of Arecibo, Porto Rico, as *Phyllodromia punctulata* (1903, Trans. Amer. Entom. Soc., XXIX, p. 130), which name was then not interpreted as it is today; later, by the same author, as *Blattella azteca* (in part) (1903, idem, p. 258), from El Yunque, Department of Humacao, Porto Rico. The material on which these records were based is now before us, the type of *borinquenensis* being the El Yunque male previously recorded. As we have already remarked under *N. adusta*, this species may be one of those referred to by Gundlach as *vitrea* and *caraibea*.

faintly obtuse, hardly marked; caudal margin very broadly and weakly obtuse-angulate. Lateral portions of pronotum semi-hyaline: in transverse section the pronotum is but faintly, and then very broadly, depressed laterad.

Tegmina elongate, lanceolate, very considerably surpassing the apex of the abdomen; costal and sutural margins as usual in this group; apex rounded rectangulate. Marginal field of tegmina of medium width, relatively elongate; scapular field broad; anal field elongate pyriform. Costal veins of tegmina sublongitudinal, a few distad bifurcate; discoidal sectors nine to ten in number; axillary veins of tegmina six in number. Wings reaching to the apices of the tegmina when closed; apex subrectangulate; costal margin arcuato-truncate in the region of the costal veins; intercalated triangle small but distinct, narrow. Costal veins of wing numerous, of which the proximal nine are moderately elongate and acute clavate, the distal ones greatly ramifying; medio-discoidal area slightly broader than medio-ulnar area, with few, regular and well-spaced cross-veinlets, forming rectangulate areolets; ulnar vein with four rami, one or more occasionally biramose; axillary vein triramose on the side toward the anal vein, one or more rami occasionally bifurcate or even ramose.

Abdomen with dorsal surface apparently unspecialized.¹ Supra-anal plate transverse, distal margin weakly arcuate produced, faintly arcuate-emarginate laterad, mesad with a very shallow, obtuse-angulate emargination.² Cerci incomplete in the type. Subgenital plate moderately produced, scoop-shaped, the lateral portions of the plate reflexed, when seen from the venter the lateral margins of the plate are arcuate, and weakly convergent to the bases of the styles; distal portion of plate between bases of styles moderately transverse, its lateral margins subparallel, the disto-lateral angles rounded, the distal margin broadly arcuate-emarginate: styles moderately surpassing the distal margin of plate, spiniform, tapering, weakly falcate.

Median and caudal femora with decided genicular spines. Cephalic femora relatively slender: ventro-cephalic margin of same with the larger spines proximad about three times as long as those at distal third, apical spines two in number, elongate, the distal the longer; ventro-caudal margin with five spaced, elongate spines. Median and caudal femora with caudal margins having large, well-spaced spines. Metatarsi biseriata spinose ventrad³; metatarsus and second joint with apical pulvilli, the third and fourth joints with pulvilli occupying virtually all of ventral surface, arolia present; tarsal claws with lamella serrulate.

ALLOTYPE.—Female⁴; Manati, Department of San Juan, Porto Rico. June 27–29, 1915. (Lutz and Mutchler; at automobile headlight, on road to Ciales.) [New York Academy of Sciences; American Museum of Natural History.]

Differing from the description of the male in the following features.

Interspace between eyes slightly greater than occipital depth of eye; ocelli less prominent than in male.

Tegmina with greatest width contained approximately three and one-fifth times in greatest length.

¹There is a certain amount of shrinkage and distortion of the dorsal surface of the abdomen evident in the unique male available, and the exact character of the surface is hard to determine.

²The form of the supra-anal plate is virtually reconstructed, as this portion is greatly and abnormally compressed in the type.

³Caudal tarsi missing.

⁴The association of this female with the male type is warranted as far as the material before us goes. The female of *adusta* is, however, unknown, and its relationship to the females of the other species cannot at present be determined. In consequence there is some possibility of error in the assignment of females to *borinquenensis* and *vomer*, but only the acquisition of mated material, or the discovery of satisfactory differential ambisexual characters, will definitely settle the matter.

Supra-anal plate transverse subtrigonal, the lateral portions of the distal margins faintly arcuato-emarginate, apex V-fissate. Cerci damaged. Subgenital plate large, scoop-shaped, moderately rostrate distad, the lateral margins converging from the cercal emarginations to the narrowly subtruncate apex; ventral surface of subgenital plate non-sulcate.

Caudal metatarsus forming three-fifths of entire tarsal length, the ventral margins with the spines well spaced and fewer than usual.

General dorsal coloration between antimony yellow and buckthorn brown, subhyaline on the tegmina and the lateral portions of pronotum, opaque and nearly antimony yellow on pronotal disk, passing to light buff on dorsum of abdomen. Ventral and limb coloration antimony yellow. Head with occiput and region between the ocelli and antennal bases cinnamon-rufous to cinnamon-brown, leaving a pale intermediate bar, the dark areas occasionally subobsolete; face not otherwise marked with dark: eyes blackish brown to russet, mottled with fuscous: palpi with third and fourth joints finely lined with fuscous on flexor surface: antennæ washed with ferruginous, weakening proximad; proximal joint with fine line of brownish. Pronotum with discal dark spots grouped as follows: three pairs mesad; one pair, more approximate, caudad; one widely-spaced pair mesad, on the discal margins; one well-spaced pair cephalo-mesad. Wings with venation pencilled in buckthorn brown. Dorsum of abdomen with segmental margining caudad, lateral oblique clouds and gland spots mummy brown; transverse fine lines on supra-anal plate, ultimate and penultimate segment of same color. Venter of abdomen, with gland spots mummy brown, laterad of these are occasionally present clouds of cinnamon-brown; subgenital plate with a ferruginous touch mesad; cerci ventrad with segments individually suffused with pale mummy brown; median and caudal femora with areas at insertion of spines mummy brown.

Male (type).—Length of body, 9.2 mm.¹; length of pronotum, 3.2; greatest width of pronotum, 4.6; length of tegmen, 13.8; greatest width of tegmen.²

Female (allotype).—Length of body, 12 mm.; length of pronotum, 3.2; greatest width of pronotum, 4.6; length of tegmen, 13.4; greatest width of tegmen, 4.2.

In addition to the type and allotype we have before us another female bearing the same data as the allotype, from The American Museum of Natural History, the female from Utuado, Department of Arecibo, Porto Rico, January, 1899, (A. Buseck), previously recorded by Rehn as *Phyllodromia punctulata*,³ from the United States National Museum, and a third female from Rio Piedras, Department of San Juan, Porto Rico, taken April 7, 1922 by F. Seín, and in the Academy of Natural Sciences of Philadelphia. The Manati female we consider a paratype. In addition we have before us an immature female from Caguas, Department of Guayama, Porto Rico, May 28–29, 1915 (Lutz and Mutchler; bushy vegetation on river bank), from The American Museum of Natural History, which we refer here, at least provisionally.

¹Body shrunken.

²Tegmina curled so that measurement cannot be taken.

³See page 80, footnote 3.

In the adults we find the number of tegminal discoidal sectors varies from as many as ten to as few as seven. The Utuado female also has the fissure of the supra-anal plate somewhat shallower and more U-shaped than in the others.

The immature specimen has the face and occiput infusate, a broad interocular bar immediately ventro-caudad of least width of the interspace, and a transverse subarcuate line on the lower face, pale; the three proximal antennal joints, the palpi, the extensor margin of the femora, the apices of the same, the extensor surface of the tibiæ, and base and apex of same and the tarsal joints distad, infusate; cerci blackish at base, then two joints pale, then infusate distad; dorsal surface of abdomen dark, speckled with small pale dots: mesonotum with a pair of large pale spots; pronotum with pattern of adults.

***Neoblattella vomer*,¹ new species**

Plate V, Figures 14 to 18

A member of the *Detersa* Group and apparently near *borinquensis* in a linear arrangement. The structure of the subgenital plate of the male is very distinctive and will prove of great value in identifying that sex. The female has a non-sulcate subgenital plate, in this agreeing with *N. vatia* and *borinquensis*.

TYPE.—Male; Mayaguez, Department of Mayaguez, Porto Rico. July 24–29, 1914. (H. G. Barber; beaten from vegetation.) [New York Academy of Sciences; American Museum of Natural History.]

Size median large; form and surface as usual in the group.

Head very narrowly projecting cephalad of the pronotum; occipital outline very weakly arcuate; interspace between eyes slightly greater than occipital depth of eye; interocellar space appreciably wider than that between eyes; ocelli distinct, relatively small, subcircular in outline; face subdeplanate; lateral margins of face very weakly converging ventrad. Palpi very elongate and slender; third joint subequal in width, very faintly arcuate proximad; fourth subequal to third joint, weakly but distinctly infundibuliform; fifth joint about three-quarters as long as fourth joint, moderately inflated, lanceolate in dorsal view, acuminate in profile. Eyes weakly projecting laterad; in base outline reniform, strongly narrowing caudo-ventrad, deep at the occiput. Antennæ with proximal joint large, moderately inflated.

Pronotum of the type usual in this group, greatest length contained about one-third in greatest width; cephalic margin subtruncate; latero-cephalic angles broadly rounded; lateral margins broadly arcuate divergent, point of greatest width distinctly caudad of middle, rounded; latero-caudal angles rounded obtuse; caudal margin very weakly obtuse-angulate.

Tegmina surpassing the apex of the abdomen by more than pronotal length, lanceolate, greatest width contained nearly three and one-half times in greatest length; costal margin arcuate proximad, nearly straight for most of the length of the scapular field, narrowly arcuate to the rounded but subacute apex, which is slightly

¹As we have stated in footnote under *adusta*, this species may be one of those reported from Porto Rico by Gundlach as *Blatta vitrea* and *Blatta caraibea*.

nearer the costal than the sutural margin. Marginal field of tegmina of medium width, elongate; scapular field mesad occupying faintly more than one-half of tegminal width; anal field elongate pyriform. Costal veins of tegmina strongly oblique, those distad moderately ramose; discoidal sectors eight in number; axillary veins six in number. Wings damaged in type.

Abdominal tergites unspecialized. Supra-anal plate strongly transverse, greatest length contained nearly four times in greatest width; margin arcuate with a very minute median fission. Cerci damaged in type. Subgenital plate symmetrical, moderately transverse, trigonal; lateral portions laterad of base of styles weakly reflexed dorsad and with their margins straight oblique (i. e., when seen from venter); portion between base of styles acute-angulate produced, when seen in profile moderately decurved and subrostrate, thickened and elevated on dorsal surface and there proximad with converging V-shaped ridges: styles reaching nearly to apex of plate, simple, tapering, aciculate, falcate, the curvature dorsad, their bases inserted in acute-angulate incisures in the margin of the plate.

Cephalic femora moderately slender; ventro-cephalic margin of same with the regular series of spines of "Type A" decreasing in length distad; apical spines of ventro-cephalic margin two in number, the distal the longer; ventro-caudal margin of cephalic femora with series of five spines on distal two-thirds. Median and caudal femora with ventral margins with regular series of well-developed spines. Caudal metatarsi, elongate, armed ventrad with biserially disposed spines, fewer than usual and most numerous distad; pulvillus small and apical. Other caudal joints missing (see allotype description); cephalic and median tarsi with apical pulvilli on all but distal joints.

ALLOTYPE.—Female; Adjuntas, Department of Aquadilla, Porto Rico. July 8–13, 1915. (Lutz and Mutchler; beaten in mixed forest on Janya road.) [New York Academy of Sciences; American Museum of Natural History.]

Differing from the description of the male type in the following features.

Size smaller than in male.¹

Interspace between eyes about one and a quarter times the occipital depth of eye.

Wings damaged but certain features ascertainable. Costal veins with six proximal ones elongate clavate; ulnar vein with five complete rami.

Supra-anal plate transverse trigonal, apex V-emarginate, the angles laterad of same narrowly rounded. Cerci elongate, fusiform, attenuate distad, composed of twelve segments, distal two-thirds with segments moniliform, subdeplanate dorsad, segments individually rounded ventrad. Subgenital plate large, subrostrate; subdeplanate laterad, median portion arcuate transversely; cercal emargination evident, rounded obtuse; distal margin acute-angulate with the immediate angle narrowly arcuato-truncate; ventral surface non-sulcate distad.

Caudal tarsi with metatarsus, and second and third joints having small apical pulvilli, ventral surface of these joints biserially spinose; fourth joint of caudal tarsi with pulvillus elongate, acute distad, and occupying almost the entire ventral surface of article.

General dorsal coloration between antimony yellow and buckthorn brown, very weak and subhyaline on the peripheral portions of the pronotum, and the marginal

¹This is, in all probability, a purely individual character.

field and costal section of the marginal field of the tegmina. General ventral coloration yellow ochre. Pronotum with the disk bearing the following fine maculations of blackish brown: a median, closely-placed paired group of three comma-like dashes; a caudal, more closely-placed, pair of simple points; mesad, a widely separated pair of simple dots, which are placed at the lateral margins of the disk; cephalad, a moderately spaced pair of comma-like dashes. Wings with the veins pencilled in buckthorn brown. Head with occiput, interocular and interocellar regions prout's brown, with a narrow edging of the paler base color next the eye margins, and with the maculation very broad obtuse-angulate ventrad: face with two transverse lines of prout's brown, one between the antennal bases, broadly U-shaped and broken mesad, the other reversed broadly W-shaped, and on lower portion of face; lateral margins of face marked with prout's brown: eyes blackish brown and tawny, mottled; palpi weakly lined ventrad with fuscous; antennæ with proximal joint lined laterad with prout's brown. Abdomen with segmental margins and adjacent surface suffused to a variable extent with mummy brown, in the male the margins of the ultimate and penultimate tergites and of the supra-anal plate sharply but narrowly pencilled with mummy brown. Ventral surface of abdomen appreciably suffused laterad with mummy brown, the gland spots solidly pointed with the same. Cerci in general pale dorsad; ventrad with segments individually and weakly washed with mummy brown. Femora weakly (median and caudal) or distinctly (cephalic) lined with tawny to mummy brown on dorsal margin; tibiæ and tarsal joints tipped with tawny to mummy brown, insertion of spines on ventro-caudal margin of cephalic femora, both margins of median and caudal femora and on extensor surface of tibiæ marked with mummy brown, with tawny in female.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, type.....	11.9	3.4	4.5	14.5	4.2 mm.
♀, allotype.....	10.6	3.1	3.9	12.6	3.6

The type and allotype are the only adult specimens of this species seen by us. A male individual in the instar preceding maturity, taken at Rio Piedras, Department of San Juan, Porto Rico, March 23, 1920, by G. N. Wolcott, and in the U. S. National Museum, is referred to this species.

THE *Lucubrans* GROUP OF THE GENUS *Neoblattella*

The four species here assembled constitute a group, that as far as known is entirely West Indian, and which we have provisionally called the *Lucubrans* Group. Whether this assemblage will prove to be a natural species group largely depends on the characters of the male sex of two of the species, which are not known at present. The species here associated, however, show certain features in the female sex alone which

apparently remove them from the vicinity of the other species of the genus seen by us. Until we know more about *Neoblattella* as a whole, and have a better conception of the interrelations of its forms, the *Lucubrans* Group may be utilized as a convenient designation for these Antillean species.

They are characterized chiefly by the tarsal claws lacking a pronounced preapical emargination or shoulder on the ventral margin, and in the male sex (where this is known) having the styles of the subgenital plate very short, lamellate and transverse, while there is no pronounced median production of the subgenital plate in the same sex. The texture is relatively smooth, the palpi short, the interocular space relatively broad, the pronotum always appreciably transverse.

Certain of these features may be found to have little group importance in combination with the others, as is known to be the case with most of them individually, but this can be determined only after more comprehensive study of the genus as a whole.

KEY TO THE SPECIES OF THE *Lucubrans* GROUP OF THE GENUS *Neoblattella*

1. Anal field of tegmina as usual in genus, moderately pyriform; axillary veins of same field with usual amount of curvature. 2.
 Anal field of tegmina more acute and elongate (*lucubrans*) or markedly elongate (*dryas*); axillary veins of same field largely straight, those mesad parallel. 3.
2. Tegmina of female but slightly surpassing apex of abdomen; marginal field of same very broad. Pronotum strongly transverse elliptical. Ventrocephalic margin of cephalic femora with proximal spines large, strongly differentiated from those more distad in position. Face with a single pale interocellar arcuate bar. Male unknown. (Hispaniola.)
 infausta, new species.
- Tegmina of female decidedly surpassing apex of abdomen; marginal field of same distinctly narrower. Pronotum transverse trapezoidal. Ventrocephalic margin of cephalic femora with proximal spines relatively small, not strongly contrasted or differentiated from those more distad in position. Face with a pale interocellar arcuate bar, dorsad bordered by a broad dark interocular bar, and ventrad by a fusiform transverse dark bar; remainder of face bearing a dark inter-antennal bar and a dark infra-antennal bar. Male unknown. (Jamaica.) *grossbecki*, new species.
3. Pronotum in general form transversely subtrapezoidal, caudal margin moderately arcuate. Tegmina markedly surpassing apex of abdomen in male sex; venation more evident, texture less corneous; marginal field of tegmina relatively narrower and more elongate; anal field less attenuate distad; discoidal field of tegmina relatively broad, of normal type, sectors more numerous (seven). Interocular space subequal to occipital depth of eye. Head markings consisting only of dark interocular bar. Cerci of male of the type usual in genus. Supra-anal plate of male trans-

verse, with a pronounced medio-distal V-emargination. Female unknown. (Jamaica.).....*lucubrans*, new species.

Pronotum in general form virtually semicircular, somewhat flattened cephalad, caudal margin very broad, distinctly subtruncate. Tegmina not exceeding, and frequently not reaching the apex of abdomen in either sex; venation less evident, texture more corneous; marginal field of tegmina broad and relatively short; anal field more attenuate distad; discoidal field of tegmina relatively narrow, sectors few (average three). Interocular space very broad in both sexes, equal in male to nearly twice occipital depth of eye. Head markings consisting of a dark interocular bar and three transverse face markings. Cerci of male very short and robust. Supra-anal plate of male transverse subtrigonal, without pronounced medio-distal emargination. Female in general appearance very similar to male. (Jamaica.).....*dryas*, new species.

***Neoblattella infausta*, new species**

Plates VI, Figures 1 to 2; VII, Figures 5 and 6

This interesting species has a rather isolated position in the *Lucubrans* Group. Superficially it bears much resemblance to *N. dryas*, having short alar appendages and an ovate form, but a more careful comparison shows many features of difference. The pronotum while strongly transverse is subelliptical and lacks the abrupt caudal truncation of *dryas*, the anal field of the tegmina is more normally shaped and the disposition and character of the discoidal sectors of the tegmina are much as in the macropterous *N. grossbecki*, while the facial pattern should not be confused with that of any other species of the genus. We are placing *infausta* before the other members of the group, in a linear sequence, although it probably represents a distinct Hispaniolan phylum, the other species here associated being Jamaican, and in many ways more nearly related. When compared with *N. grossbecki* the pronotal form, the shorter, more lanceolate tegmina and more abbreviate wings, more decided and more elongate proximal spines on the ventro-cephalic margin of the cephalic femora, the somewhat smaller size, the shorter tarsi, and the different facial pattern will aid in separating *infausta*.

The male sex is not known and in consequence comparison with *N. lucubrans* is somewhat difficult. The distinctive color pattern of the latter is, however, sufficient at once to remove *lucubrans* from any possibility of confusion with *infausta*. The pronotal form, that of the tegmina, with the very differently proportioned anal field, and the markedly shorter tarsi of *infausta* may be mentioned as structural differences which are not markedly affected sexually in most species of the genus *Neoblattella*. The present species is widely separated from *N. dryas* and further detailed comparison is unnecessary.

TYPE.—Female; Haïti, Hispaniola. [Museum of Comparative Zoölogy.]

Size very small (for genus); form depressed elliptical; surface moderately polished.

Head hardly visible cephalad of pronotum when viewed from the dorsum: in outline deeper than wide; interspace between eyes broad, equal to one and one-half times the occipital depth of eye, and very faintly less than that between antennal scrobes: face weakly rounded, hardly inflated; lateral margins of face regularly and

appreciably straight convergent ventrad: palpi of the type found in *N. grossbecki*, but with the third and fourth joints more slender in proportion; eyes weakly protuberant laterad, in basal outline as in *grossbecki* but less prolonged ventrad; antennæ at least as long as the body.

Pronotum strongly transverse, subelliptical, greatest length contained one and one-half times in greatest width,¹ the point of greatest width appreciably caudad of the middle: cephalic margin broadly and moderately arcuate, passing broadly and regularly into cephalic half of lateral margins, which are strongly divergent arcuate to the obtusely rounded points of greatest width, caudad of which the lateral margins are oblique subarcuate convergent, passing by a hardly evident angle into the broad, subtruncate caudal margin; disk with a pair of weak, connected impressions cephalad of the middle: in transverse section the pronotum is weakly but regularly arcuate.

Tegmina slightly shorter than body length and surpassing the apex of the abdomen by less than the pronotal length, broad lanceolate, very weakly acuminate distad; greatest width contained slightly more than three times in greatest length: costal margin decidedly and regularly arcuate; sutural margin straight in the greater portion of its length, distad rounding to the blunted and rounded, but in general acute-angulate, apex: marginal field broad, relatively shorter than usual; anal field pyriform, slightly elongate: costal veins twelve to thirteen in number, a number of the distal ones carried by two rami of the discoidal vein; discoidal sectors six in number, the trunk of median vein included in this count; axillary veins five in number. Wings apparently falling faintly short of the tegminal apices, apex of wing damaged; intercalated triangle present but damaged: costal veins proper seven in number, elongate clavate, distal less strikingly so, rami of the discoidal vein carry five additional non-clavate costal veins distad; medio-discoidal area slightly broader than medio-ulnar area, with fewer and more irregular cross-veins and consequently less distinct and regular areolets than in *N. grossbecki*: ulnar vein triramous; axillary vein quadriramous.

Abdomen broad, depressed; tergites unmodified: supra-anal plate transverse, distal margin moderately arcuate, very shallowly and broadly emarginate mesad, the margin with bristle-like hairs similar to but fewer in number than those found in *N. grossbecki*; cerci elongate fusiform, very slender distad, depressed dorsad, rounded ventrad, with ten apparent segments: subgenital plate large, scoop-shaped, mesad broad triangularly produced, the margins straight oblique from the very weak cercal emarginations to the relatively broad, subtruncate apex.

Cephalic femora with the "Type A" spination on ventro-cephalic margin having the proximal spines distinctly longer and more robust than in *N. grossbecki*, three being particularly heavy and subfalcate, the series regularly decreasing in size and length to about the fifth spine from distal end of row, thence slightly increasing in length distad; distal pair of spines very long and prominent, the distal somewhat the longer; ventro-caudal margin of cephalic femora with four spines, one apical in position. Median and caudal femora well spined on ventral margins. Caudal tarsi similar in type to those of *N. grossbecki*, but less elongate. Tarsal claws very finely serrulate ventrad.

General color of head, disk of pronotum, thorax, coxæ and limbs ochraceous-buff; peripheral portions of pronotum, tegmina and wings semihyaline light ochraceous-

¹Plate III, figure 5, shows the pronotum somewhat too strongly transverse and broader in proportion to length than is true.

buff (virtually "testaceous"). Head without pronounced maculations; eyes pitch black. Disk of pronotum with an incomplete transverse subelliptical pencilling of prout's brown, which outlines the disk cephalad and laterad but not caudad. A pair of prout's brown blotches, made up of spots and not sharply defined, are placed on the transverse pronotal axis. Wings moderately suffused with prout's brown in the region of the costal veins, this bordered in the same region along the costal margin by a marked, but narrow, band of opaque cream-white. Abdomen above fuscous, narrowly edged laterad and caudad with whitish; below fuscous, irregularly margined with pale ochraceous-salmon, the fuscous of the segments broken up by irregular transverse stripes of pale buckthorn brown; subgenital plate largely pale buckthorn brown. Spines of the general color.

Length of body, 7.8 mm.; length of pronotum, 2.6; greatest width of pronotum, 3.9; length of tegmen, 7.6; greatest width of tegmen, 2.5.

In addition to the type we have before us a single paratypic female from the collection of the American Museum, taken at Port-au-Prince, Haiti, March 5-11, 1922, (F. E. Watson), which shows a few differences from the above description of the type. The interspace between the eyes is somewhat broader, equalling one and three-fourths times the occipital depth of eye; the number of discoidal sectors of the tegmina is five, distad dividing into seven; distal margin of subgenital plate is very shallowly emarginate; interocellar region of face with a transverse arcuate bar of creamy white; venter of abdomen, except for subgenital plate, with each segment margined distad with a broad, poorly defined border of pale ochraceous-buff, the remainder of each segment virtually a tessellate mosaic of mummy brown and ochraceous, without clearly defined disposition, the subgenital plate ochraceous, on its disk with a heavy but rather poorly defined blotch of cinnamon-brown. These differences we feel are purely individual and a sufficient series would demonstrate the occurrence of intermediate conditions.

***Neoblattella grossbecki*, new species**

Plates VI, Figures 3 to 4; VII, Figures 1 to 4

The present species forms with the following *N. lucubrans* a division of the group roughly characterized by having tegmina and wings decidedly surpassing the apex of the abdomen; in the present species this is even true of the female sex, which is unknown in *N. lucubrans*. From *lucubrans* the present species differs chiefly in the more robust palpi, the distal joint of which is broad when seen in extensor aspect, the numerous and straighter axillary veins of the tegmina, in the decided and complicated facial pattern, which is not present in *lucubrans*, in the median section of the ventral surface of the abdomen being dark with lateral section pale, instead of the reverse as in *lucubrans*, and in the much less elongate proximal spines on the ventrocephalic margin of cephalic femora. With *infausta* and *dryas*, the other species of the group, no detailed comparison is necessary as these species have far shorter tegmina and a quite different general appearance.

TYPE.—Female; Cinchona, Blue Mountains, St. Andrew Parish, Jamaica. Elevation, 4900 feet. February 18, 1911. (J. Grossbeck; at light.) [American Museum of Natural History.]

Size small (for the genus); form depressed, tegmina and wings surpassing apex of abdomen; surface glabrous.

Head subdepressed, in almost its entire width visible cephalad of pronotum; interocular region in width very faintly narrower than that between antennal scrobes, and equal to one and one-quarter times the occipital depth of eye: lateral margins of face distinctly converging ventrad; greatest length of head faintly greater than greatest width: palpi with third joint straight, moderately slender; fourth joint about three-quarters as long as third, moderately infundibuliform: fifth joint subequal to fourth in length, appreciably inflated and in consequence deeper and broader than fourth joint, the ventral margin gently oblique subtruncate distad to the apex, which is acute in profile and rounded rectangulate seen from the extensor surface: eyes moderately protuberant laterad, elongate reniform in basal outline, prolonged and regularly narrowing ventrad; antennæ damaged.

Pronotum transverse, greatest length contained one and two-fifth times in greatest width, latter slightly caudad of middle: cephalic margin of disk moderately arcuate, regularly passing into the oblique arcuate cephalic portion of lateral margins, which markedly diverge to the broadly rounded point of greatest width, brief caudal section of lateral margins arcuate-subtruncate, passing by faint angulation into the slightly arcuate and broad caudal margin; surface of disk with a shallow, broadly V-shaped depression slightly cephalad of middle: in transverse section the whole pronotum is uniformly and faintly arcuate.

Tegmina elongate lanceolate, slightly longer than body length, greatest width contained in length faintly more than three times, surpassing the apex of abdomen by about length of pronotum: costal margin of tegmina regularly and gently arcuate to near apex, to which the margin is then more strongly arcuate; sutural margin faintly arcuate in area of anal field, straight distad of same to distal fourth, where it is obliquely arcuate to the rounded rectangulate apex: marginal field relatively broad; anal field somewhat elongate, pyriform: costal veins thirteen to fourteen in number, distal ones bifurcate, occasional discoidal veins fork well before apex and sutural branch carries the costal veins: discoidal sectors longitudinal, six to seven in number; axillary veins weakly arcuate, five in number. Wings in repose reaching to tegminal apices, very broad in proportion to length, greatest width contained about one and one-third times in greatest length; immediate apex rounded rectangulate, the general apex subtruncate; intercalated triangle small but distinct, its length not greater than one-seventh that of wing, not projecting: costal veins proper ten in number, briefly and moderately but appreciably clavate, less distinctly so distad, a number of distal rami of the discoidal vein non-clavate; medio-discoidal area slightly broader than medio-ulnar area, with numerous transverse divisions into rectangulate and generally subquadrate areolets; ulnar vein biramose, all reaching the apical margin; axillary vein triramose on costal side of vein, all reaching margin of area.

Abdomen broad, strongly depressed; dorsal surface unmodified; supra-anal plate strongly transverse, narrowing laterad, distal margin subsigmoid on each side and with a broad, rounded emargination mesad, the sections laterad of this emargination rounded sublobate, most of the margin other than the emargination with spaced, bristle-like hairs, lying in the same plane as the plate; cerci elongate fusiform, narrow,

deplanate dorsad, rounded ventrad, twelve joints apparent, distal one very slender; subgenital plate large, broad, scoop-shaped, cercal emarginations distinct, median section of plate trigonal, the sides regularly straight convergent from cercal emarginations to the relatively narrow arcuate-truncate apex.

Cephalic femora with ventro-cephalic margin having the proximal spines relatively short and the gradation in size distad very slight and regular, the two distal spines of series showing a slight increase in length over those adjacent, larger spines of this series with no evident serrulations on distal face; distal spines two in number, the terminal one-half again as long as the more proximal one: ventro-caudal margin with two to three spines on distal half, one apical in position. Median and caudal femora with ventral margins regularly and strongly spined. Caudal tarsi elongate, with metatarsus considerably surpassing remainder combined, biserially spined on ventral surface, with very small apical pulvillus: second joint of caudal tarsus similarly spined, with a similar but more elongate pulvillus; third and fourth joints with pulvilli, on the third apical, on the fourth covering most of article, acute and produced. Arolia present on all tarsi; tarsal claws very finely serrulate ventrad, no evident shoulder or preapical flange on this margin.

General color pale ochraceous-buff, opaque on the pronotal disk, head, palpi and coxæ, translucent to transparent on tegmina and most of limbs. Head with a broad mummy brown band between eyes, weakened dorsad, separated by a clear and sharply defined narrow line of the base color from an elongate diamond-shaped bar of mummy brown ventrad (above antennal base), below which on the face follows a band of the base color, a transverse blotch of mummy brown (below antennal bases), an arcuate bar of the base color and an incomplete arcuation of mummy brown; eyes blotched fuscous and mummy brown. Pronotum with lateral sections hyaline, faintly washed with the general color. Tegmina with marginal field colored as lateral sections of pronotum. Wings hyaline faintly washed with general color, veins pencilled in dresden brown. Abdomen dresden brown, suffused mesad on ventral surface with fuscous, the lateral sections of ventral surface washed, the usual depressions pointed, and much of the margin of the subgenital plate pencilled with fuscous; dorsal surface of abdomen fuscous, with a medio-proximal section paling to pale ochraceous-buff. Limbs with tibial spines pale tawny, darkened distad; point of insertion of the larger femoral and tibial spines marked with mummy brown, which also weakly lines the ventral margins of the median and caudal femora and the dorsal margin of the cephalic femora.

Length of body, 9.9 mm.; length of pronotum, 2.6; greatest width of pronotum, 3.6; length of tegmen, 10.7; greatest width of tegmen, 3.5.

The type is the only adult of the species seen, but we have before us an immature male and two immature females, taken by the senior author in the mountain forest between Pleasant Hill and St. Helens Gap, Blue Mountains, 4400-4780 feet, July 24 and 25, 1923. These were secured from epiphytic bromeliads and hollow bases of dead tree fern fronds. Two of these specimens are in the instar preceding maturity, the third in its antecedent. The face and dorsal and ventral surfaces of the abdomen show the distinctive color features of the species.

We take pleasure in dedicating this species to its collector, the late John Grossbeck, as a slight tribute to a promising brother entomologist, whose work was cut short by an untimely death.

***Neoblattella lucubrans*,¹ new species**

Plate VI, Figures 5 to 8

A long-winged species that superficially shows much resemblance to *N. grossbecki*, but which, on the basis of opposite sexes, differs principally in the features given in the key and in the diagnosis of the latter species. While the localities from which the two species are described are very near one another, there is no possibility of the two representing sexes of the same species, the palpal, tegminal and cephalic and abdominal coloration features being of such character as to prevent this being the case. The recognition of immature material of *grossbecki* taken in July may also indicate it is probably a species maturing later in the season than *lucubrans*.

TYPE.—Male; Pleasant Hill, Blue Mountains, Jamaica. Elevation, 3635 feet. July 30, 1923. (Rehn; attracted to light of gasolene lantern.) [Academy of Natural Sciences of Philadelphia, Type No. 5415.]

Size somewhat larger than in *N. grossbecki*; form and surface in general similar.

Head but narrowly visible cephalad of pronotum when seen from dorsum; in cephalic aspect the head is pyriform, greatest depth slightly greater than width across eyes; occipital interspace between eyes broad, subequal to occipital depth of eye; interspace between ocellar spots about one-fourth wider than occipital interspace between eyes; lateral margins of face ventrad of eyes nearly straight convergent ventrad. Eyes moderately prominent laterad, extending ventrad but slightly below ventral margin of antennal scrobes. Palpi very slender, moderately elongate, compressed, third and fourth joints subequal in length, latter weakly infundibuliform; distal joint about four-fifths the length of fourth joint, moderately inflated, its ventral margin, as seen in profile, largely weak arcuate, seen from extensor surface this joint is appreciably compressed.

Pronotum of the form and proportions found in many species of the genus, ovate-subtrapezoidal, greatest length contained one and two-fifths times in greatest width, which is somewhat caudad of the middle; cephalic margin moderately arcuate, passing through broad arcuations into the oblique and weakly arcuate lateral margins, which broadly rounding over point of greatest width pass by a slightly obtuse angulation into the faintly obtuse-angulate caudal margin; surface of pronotum with distinct indications of the supra-cephalic bullation of pronotal disk as found in *N. grossbecki*.

Tegmina and wings elongate, surpassing apex of abdomen by one and one-third times pronotal length. Tegmina lanceolate, greatest width contained three and three-fifths times in greatest length of same: costal margin moderately arcuate in proximal two-fifths, thence straight to near apex, where it narrowly rounds; sutural margin virtually straight except for brief arcuate proximal section, distad for short distance oblique subarcuate to narrowly rounded apex: proportions of fields as in *N. grossbecki* except that anal field is more elongate pyriform: costal veins more numerous, nineteen to twenty in number, counting all the distal rami; discoidal sectors seven in

¹In allusion to the action of the species in coming to light.

number (including main median vein); axillary veins six in number, straighter than in *N. grossbecki*. Wings with intercalated triangle small, narrow; costal veins twelve in number, proximal nine elongate clavate; ulnar vein bifurcate near middle, distad with two short rami, all complete and reaching distal margin: medio-discoidal and medio-ulnar areas virtually subequal in width taken in their entirety; interspace between ulnar vein and its proximal branch broader than either of above-mentioned fields, its cross-veins producing subquadrate areolets.

Supra-anal plate transverse, distal margin arcuately bilobate, median emargination very broadly V-shaped, ventral surface of distal margin with series of chætiform hairs. Subgenital plate transverse, lateral sections of distal margin obliquely subtruncate convergent; interstyler section of distal margin with its median portion having a weakly elevated subtruncate transverse thickening, which is cicatriform in character; styler sockets broad, transverse, little excavated at the alveolus: styles very short, transverse lamellæ, seen in ventral aspect they are more than twice as broad as long, dorsal surface and distal margin with closely-set shagreenous teeth, which on distal margin as seen in ventral aspect radiate over the periphery; in caudal aspect the lateral portions of distal margin of subgenital plate immediately laterad of styles are seen to be thickened and supplied within anal cavity with numerous chætæ, scattered chætæ are also found on distal margin and ventral surface of subgenital plate. Cerci moderately elongate, tapering in distal half.

Cephalic femora with proximal spines of ventro-cephalic margin large, three or four in number, sharply contrasted with the far shorter spines of more distal portion of series; distal pair of spines of same margin elongate, subequal: ventro-caudal margin of cephalic femora with four large spaced spines, one of which is subapical. Caudal tarsi elongate, slender, in large part subcompressed; caudal metatarsus forming nearly two-thirds of length of entire tarsus; ventral surface of metatarsus and following joint biseriate spinulose, a sparser series of spinules is present on distal two-thirds of dorsal margins of metatarsus and at its distal extremity, a few similar spinules distad on following two joints; pulvilli present distad throughout. Arolia large. Tarsal claws equal, ventral margin of same finely serrulate, with no preapical diastema or emargination.

Disk of pronotum ochraceous-orange, virtually unmarked except for a median pair of diverging, comma-like spots of fuscous; lateral sections of pronotum yellowish hyaline. Tegmina washed with very pale buckthorn brown except for the nearly clear hyaline marginal field and portion of scapular field adjacent to costal margin; all tegminal veins lined with dresden brown, except portions of costal veins in hyaline section of marginal field and in vicinity of the forking of the median vein. Head with occiput, face, mouth-parts and antennæ ochraceous-orange, face unmarked; interocular dark bar fuscous, broad, equal in width to occipital depth of eye, ventral margin concave; palpi pale dresden brown, clouded with mummy brown. Eyes dark prout's brown. Ventral surface with broad dark (mummy brown) lateral bars extending from prothoracic trochanters, over external section of mesopleura and metapleura, on latter also reaching as a line to apex of coxæ, and as broad abdominal bars, each a third as wide as the abdomen, to the subgenital plate, where the two meet and fuse; median pale portion of venter of abdomen narrower than dark lateral bars, dull ochraceous-orange; laterad on the abdomen the dark bars are narrowly edged with light buff; subgenital plate with a pale spot of pale ochraceous-orange at each styler base and indications of another meso-distad. Cerci pale ochraceous-buff proximad and preapic-

ally washed with prout's brown, more decided on dorsal surface. Dorsal surface mummy brown, very narrowly edged laterad with light buff. Coxæ light buff, remainder of limbs dull ochraceous-orange, spines concolorous.

Length of body, 11.2 mm.; length of pronotum, 2.7; greatest width of pronotum, 3.8; length of tegmen, 13; greatest width of tegmen, 3.6.

The type of this most interesting species is unique. In every way *lucubrans* is a very distinct form, with a striking and markedly distinctive coloration. We have no information regarding the species additional to that given above for the type.

***Neoblattella dryas*¹ new species**

Plate VI, Figures 9 to 12

A very distinct and peculiar bromeliadiculous species, which can at once be separated from the other members of the group by the semicircular form of the pronotum, the caudal margin of which is quite strongly transverse, the relatively short, lanceolate tegmina, which have strongly longitudinal discoidal sectors and a greatly extended anal field, a very broad interspace between the eyes in both sexes, very short and robust cerci, relatively short tarsi and characteristic male genitalia.

TYPE.—Male; Morces Gap, Blue Mountains, Jamaica. Elevation, 4980 feet. July 21, 1923. (Rehn; from dead bases of tree fern fronds.) [Academy of Natural Sciences of Philadelphia, Type No. 5416.]

Size small (for genus); form elliptical, alar organs not surpassing apex of abdomen; surface dully polished.

Head but narrowly evident cephalad of pronotum when seen from dorsum; seen in cephalic aspect head outline is subpyriform, greatest breadth across eyes subequal to depth of head, ventral portion of head regularly narrowing ventrad of eyes: interspace between eyes very broad for male sex, subequal to interspace between antennal scrobes, one and two-thirds times as great as occipital depth of eye. Palpi slender, moderately elongate; penultimate joint slightly shorter than antepenultimate joint, weakly infundibuliform; ultimate joint subequal to penultimate in length, shallow, hardly compressed.

Pronotum relatively large, in general form virtually semicircular with a trapezoid tendency, due to flattening of the cephalic margin, moderately transverse, greatest length contained slightly more than one and one-half times in greatest width, which is virtually at caudal margin: cephalic margin arcuato-truncate, nearly equal to one-half of greatest width of pronotum, rounding laterad into the caudad diverging, moderately arcuate lateral margins; caudo-lateral angles narrowly rounded subrectangulate; caudal margin arcuato-truncate: in transverse section disk of pronotum is moderately arcuate, lateral sections moderately deflexed, weakly concave.

Tegmina moderately acute lanceolate, reaching to but not surpassing apex of abdomen, greatest width contained two and two-thirds times in greatest length of same: costal margin arcuate, slightly more flattened proximad than distad; apex narrowed, rounded acute-angulate; sutural margin nearly straight: marginal field very short and broad, by no means reaching as far distad as apex of anal field; scapular field in width about equal to one-half that of entire tegmen; anal field quite elongate pyriform, produced distad of middle of tegmen; costal veins nine to eleven in number; discoidal sectors of all character but three in number, markedly longitudinal; anal

¹I. e., a wood nymph, from its forest habitat.

suleus prolonged distad in a subsigmoid fashion, outlining the unusual extension of anal field; axillary veins four in number. Wings¹ reaching to apex of tegmina when in repose, when spread seen to be non-functional as organs of flight, radiate field being poorly developed and incapable of full or normal expansion, its texture somewhat coriaceous; general form of spread wing elongate ovate, width contained about twice in length, that of radiate field but slightly greater than that of anterior field; apex rounded rectangulate, peripheral margin of radiate field appreciably crenulate: costal veins simple, spaced, weakly clavate; ulnar vein simple, unbranched: medio-discoidal area faintly wider than medio-ulnar area.

Abdomen with three distal tergites appreciably narrower than other tergites; antepenultimate tergite almost hidden under preceding tergite, with distal margin broadly concave, laterad transverse truncate; penultimate tergite with lateral margins subparallel, distal margin transversely truncate with a faint median emargination; supra-anal plate transverse subtrigonal, greatest length contained about three times in greatest width, margin slightly concave on lateral sections, very faintly bilobate on median produced section, several large chætæ projecting caudad from this portion. Cerci short, robust, depressed, fusiform, composed of approximately ten articles (proximal ones not sharply defined), median and distal articles sharply defined, those distad regularly reducing in size, apical one styliform but not exceeding its predecessor in length. Subgenital plate in section subdeplanate mesad with lateral portions obliquely ascending and diverging dorso-laterad, in ventral aspect lateral margins of plate are seen to be obliquely subsigmoid, converging to region of stylar bases, the latter well seated within margin of plate, intervening section of margin biconcave with a median brief labiate production, which, as well as lateral surfaces of plate, possesses scattered erect chætæ; styles short, transverse lamellations, hardly projecting distad of adjacent lateral sections of plate margin, subdepressed, distad armed with a number of mesad directed, recurved, claw-like teeth.

Cephalic femora with ventro-cephalic margin armed with spines which markedly decrease in size and length distad; ventro-caudal margin with two spaced spines meso-distad in addition to apical one: caudal tarsi moderately long, metatarsus subequal in length to remaining tarsal joints, ventral surface biseriate spinulose; apical pulvilli present throughout; arolia large. Tarsal claws equal, ventral margin with no apical diastema, mesad crenulato-denticulate.

ALLOTYPE.—Female; same data as type, but date is July 29, 1923, and the series secured then was taken from dead tree fern frond bases and from bromeliads. [Academy of Natural Sciences of Philadelphia.]

Differing from the above description of the male in the following noteworthy features.

Interspace between eyes slightly greater than that between antennal scrobes, faintly more than twice as great as occipital depth of eye.

Tegmina faintly less produced distad, with apex blunter, less acute.

Abdomen regularly narrowing distad from middle: antepenultimate tergite largely hidden under preceding tergite, more shallow concave than in male; penultimate tergite with margin largely transverse truncate but weakly oblique laterad; supra-anal plate as in male. Cerci essentially as in male. Subgenital plate large, simple, between infra-cercal emarginations with margin broadly arcuate, weakly and narrowly flattened mesad.

¹The features of the wing have been taken from paratypic material, as to save possible damage of the type it has not been spread.

General color of dorsum light ochraceous-buff to ochraceous-buff, lateral portions of pronotum of the same general tone but semi-hyaline, tegmina very similar, but more opaque in fields other than the marginal; general color of venter much as of dorsum except for details here stated. Head with base color showing a tendency toward ochraceous-orange; pattern of dresden brown to mummy brown indicated as follows: a broad interocular bar, clearly defined ventrad, less sharply margined dorsad; a transverse bar, situated at dorsal margin of antennal scrobes, narrow laterad, broad mesad, varying in strength and solidity, occasionally coalescing mesad with a more ventral transverse interantennal marking which is arcuate and occasionally breaks into four component parts, very rarely these two bars are almost solidly combined; a broadly V-shaped marking unites ventral portions of antennal scrobes, which are also largely bordered with the same color, this V-shaped marking varying to subobsolete and occasionally markedly interrupted mesad. Eyes mars brown to mummy brown. Antennæ with the exception of several proximal joints washed with cinnamon brown. Pronotum ranging from unmarked in the one extreme to the other bearing an irregular, poorly defined pair of dark bars or more properly clouds, which in the more extreme condition join at the cephalic margin, where a transverse bar of prout's brown is indicated, the dark bars, when present, more pronounced cephalad and caudad than elsewhere. Dorsal surface of abdomen washed with prout's to mummy brown to a variable degree, occasionally largely of the general color, with a reduced infuscation distad. Venter of abdomen with a pair of intermarginal dark (prout's brown to mummy brown) lateral bars, which range from broad and continuous, reaching to the penultimate sternite (σ) or lateral bases of the subgenital plate (φ) and laterad involving much of the lateral margins of the sternites themselves, to the other extreme where these bars are broken into subtrigonal blotches on each segment; a median, generally obscure bar of similar color is indicated proximad, which on the subgenital plate frequently reappears in a broad infuscation of the whole medio-distal section; occasionally the distinction of median and lateral bars becomes less evident and the usual intervening pale area of the base color is clouded and with little definition. Cerci of the general color, frequently with a proximal darkening, a preapical dark annulus and a very small dark tip; occasionally they are unmarked except for the proximal darkening. Coxæ washed proximad with prout's brown to mummy brown; tibiæ with vicinity of spine bases and narrow complete or incomplete distal annuli of the same color.

The immature specimens show essentially the same colorational features as the adults. The pronotum is always bilineate, these continued over the other thoracic nota and even the tergites of the abdomen, so that the bilineate condition is pronounced and distinctive. The facial markings are frequently broken mesad and the venter of the abdomen is more universally dark, with the bars of the adult much less evident or definite.

The following measurements of representative individuals show that considerable size variation or plasticity is present in both sexes and regardless of exact locality. It is equally evident that the tegmina and pronotum vary considerably in their relative proportions.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Morces Gap, Jamaica, type.....	9.6	2.7	4.2	7	2.5 mm.
♂, Morces Gap, Jamaica, paratype...	9.5	2.5	3.8	6.8	2.5
♂, Morces Gap, Jamaica, paratype...	9.8	2.4	3.8	6.5	2.5
♂, West slope of Sir John Peter Grant Peak, Jamaica, para- type.....	9.8	2.8	4.3	8.2	2.8
♂, Between Pleasant Hill and St. Helens Gap, Jamaica, para- type.....	9.2	2.6	4	6.6	2.7
♀, Morces Gap, Jamaica, allotype....	9.1	2.5	4	7	2.6
♀, Morces Gap, Jamaica, paratype...	10	2.7	4	6.8	2.6
♀, Morces Gap, Jamaica, paratype...	8.8	2.5	3.7	6.2	2.5

We have before us a most interesting series of fourteen adults, in addition to the type and allotype, and fifteen immature individuals, all taken in the Blue Mountains of Jamaica by the senior author. All of the additional adult specimens we are considering paratypes. The additional data of the specimens before us are as follows:

Morces Gap, elevation 4980 feet, July 19, 1923, (from epiphytic bromeliads), 3 immature individuals; July 21, 1923, (same habitat notes as type); 1♂, 2♀, 1 immature individual; July 29, 1923, (numerous in bromeliad and in dead tree fern bases), 1♂, 1♀, 2 immature individuals; July 30, 1923, (under bark of *Vaccinium*), 1♀, 1 immature individual. West slope of Sir John Peter Grant Peak, elevation 5700 feet, July 26, 1923, (from bromeliads in dense ridge type of forest), 1♂, 9 immature individuals. New Haven Gap, elevation 5600 feet, July 26, 1923, (in bromeliads), 2 immature individuals. Between Pleasant Hill and St. Helens Gap, elevation 4650 feet, July 24, 1923, (from bromeliads), 1♂.

The immature specimens represent at least the two instars preceding maturity, both of which were taken at Morces Gap on July 29. One of

the females from Morces Gap, July 29, bears a protruding oötheca, which is carried with the carina dorsad.

The male subgenital plate is seen to vary appreciably in the exact form of the inter-stylar portion of the distal margin, also the distance apart of the styles. The margin ranges in form from that described in the type, on one hand, to one which is regularly concave with no median protuberance of any sort and, on the other hand, to a phase lacking a median protuberance and very broadly V-emarginate, but with distinct juxta-stylar flanges bordering the concavity laterad. The general form, however, is in all sufficiently distinctive to show the specific identity of the material.

The species is a most secretive one, to be found only after patient and continued searching of bromeliads, in bark crevices and similar hiding places in the mountain forest, and was not encountered by us below 4650 feet elevation. In addition all the specimens taken were from areas which are regularly bathed in trade-wind driven fog, except the single one taken July 24, which was in a bromeliad on a tree in an isolated and exposed forest patch topping a ridge, and thus receiving more fog than areas immediately below, or even spots as high but more protected by the drier leeward slopes of encircling ridges from the main Blue Mountain chain.

Blattella germanica (Linnæus)

[*Blatta*] *germanica* LINNÆUS, 1767, 'Syst. Nat.', 12th Ed., I, p. 668. Denmark.

CUBA.—Pinar del Rio, Province of Pinar del Rio, IX, 9-24, 1913, (Leng; in hotel), 1 ♀.

HISPANIOLA.—Azua, Province of Azua, Dominican Republic, III, 13, 1913, (P. G. Russell), 1 ♀, [U. S. N. M.].

GRENADA.—June, (Aug. Busck), 1 ♂, [U. S. N. M.].

This cosmopolitan domiciliary pest has been recorded from Cuba (by Serville, Guérin, Brunner, Walker, Saussure, Gundlach and Bolivar); Porto Rico (Gundlach, Sefn, and Wolcott), and specifically Fajardo (Rehn) and Condado (Wolcott) in that island; Kingston, Jamaica (Cockerell), and Barbados (Caudell). Gundlach says it occurs all over Cuba and Cockerell states it is troublesome in houses in Jamaica. Sefn considers it a veritable plague in Porto Rico.

CHROMATONOTUS Hebard

As far as present knowledge is concerned, this genus of small, usually strikingly marked blattids is composed of six species, distributed from Guatemala to Colombia, east to Trinidad and north in the Lesser Antilles

to Grenada. We have no definite information as to the occurrence of the genus at localities on the north coast of South America, but it doubtless occurs in suitable environments and probably has a more extensive range to the southward. Two of the species are known from Panama (*heterus* and *lamprus*), one from Guatemala (*agunæ*), one from Colombia (*andagoyæ*), one solely from Trinidad (*infuscatus*), and the remaining species from Trinidad and Grenada (*notatus*).

Hebard when describing the genus has given some useful notes on its relationship and characters.¹

Chromatonotus notatus (Brunner)

P [hyllodromia] notata BRUNNER, 1893, Proc. Zool. Soc. London, p. 602, Pl. LII, figs. 1a and 1b. ♂, ♀; St. George's and Balthazar, Grenada.

No additional information is at hand regarding the occurrence of this species in the West Indies.

Nymphodromia,¹ new genus

A member of the Group Blattellæ, having some affinity with *Dendroblatta* Rehn, but it shows tendencies toward the aberrant genus *Euphyllodromia* Shelford, which it may link with the Blattellæ. It agrees with *Euphyllodromia* principally in having the head broad and depressed, the pronotum strongly transverse elliptical and the humeral trunk of the tegmina sigmoid in character. From *Euphyllodromia* the present genus differs principally in having the interspace between the eyes very broad, the ulnar vein and the sutural ramus of the median vein of the tegmina not angled, the sectors of the discoidal field of the tegmina more numerous, in the elongate, simple palpi, the spout-shaped male subgenital plate, the entire subgenital plate of the female and the "Type A" spination of the ventro-cephalic margin of the cephalic femora. From *Dendroblatta* the new genus can be readily distinguished by the greater interspace between the eyes, the elongate and simple palpi, the fewer and longitudinal sectors of the discoidal field of the tegmina, by the enlarged costal veins of the wing, the fewer ulnar rami of the wings, symmetrical male subgenital plate and the spination of the ventro-cephalic margin of the cephalic femora.

GENERIC DESCRIPTION.—Form depressed. Head strongly depressed and transverse; occiput straight transverse; face with lateral margins convergent ventrad; palpi simple. Pronotum strongly deplanate, transverse, sub-elliptical, lateral portions hyaline. Tegmina elongate lanceolate, surpassing apex of abdomen; scapular field

¹1920, Mem. Amer. Entom. Soc., No. 4, pp. 44-46.

²From *νυμφη*, nymph and *δρομευς*, a runner.

very broad; costal veins regular; discoidal sectors longitudinal; ulnar vein not angulate. Wings with small intercalated triangle present; costal veins elongate clavate; ulnar vein complete tri- or quadriramous; axillary vein triramous on peripheral side. Abdomen without marked surface modification; supra-anal plate of male and female transverse, arcuate produced mesad; subgenital plate of male with median shute-shaped process; styles specialized: subgenital plate of female produced and flattened mesad. Cephalic femora slender; ventro-cephalic margin armed with "Type A" spination; ventro-caudal margin spined: median and caudal femora with genicular spines; caudal tarsi with proximal joints subequal to twice the length of remainder, biserially spinulose ventrad, with small apical pulvillus. Arolia present. Tarsal claws serrulate mesad on ventral surface.

GENOTYPE.—*N. miranda*, new species.

***Nymphodromia miranda*, new species**

Plate VII, Figures 7 to 13

TYPE.—Male; San Francisco Mountains, thirteen kilometers north of San Cristobal, Province of Santo Domingo,¹ Dominican Republic, Hispaniola. September, 1905. (August Busck.) [United States National Museum.]

Size rather small; surface in general weakly polished.

Head appreciably visible cephalad of pronotum for its full width; occipital line, when seen from dorsum, straight transverse: head in outline trigonal, the greatest width across eyes contained one and one-fifth times in greatest depth (i. e., occiput to labrum) of head; lateral margins of face ventrad of eyes straight convergent to near the maxillary palpal bases; interspace between eyes equal to the transverse dimension of eye when seen from occipital aspect; face distinctly but not abruptly deplanate, transversely weak arcuate, nearly straight in profile: palpi with third joint moderately slender and elongate; fourth joint equal to three-quarters of the length of third joint, straight, moderately infundibuliform; fifth joint slightly longer than fourth joint, moderately inflated, lanceolate when seen from extensor surface, in profile with ventral outline arcuate and dorsal line straight in proximal three-quarters, apex in profile acute angulate, concavity of flexor surface deep; eyes prominent laterad, strongly arcuate in outline; basal outline weakly reniform, narrowing ventrad: antennæ surpassing the body in length, proximal joint large, slightly arcuate.

Pronotum strongly deplanate, very weakly arcuate transversely, in form elliptical, transverse, greatest length contained one and two-fifths times in greatest width of same; latter placed very slightly caudad of middle: cephalic margin moderately and regularly arcuate, regularly passing into the lateral margins, which are strongly arcuate, the point of greatest width not angulate in the least; caudo-lateral angle rounded obtuse; caudal margin truncate: disk of pronotum with a very weak U-shaped impression cephalad and weak undulations of the surface caudo-laterad.

Tegmina surpassing the apex of the supra-anal plate by the length of pronotum, elongate lanceolate, greatest width contained three and one-fifth times in greatest length: costal margin arcuate proximad, nearly straight thence distad and rather shortly arcuate to the rounded rectangulate apex; sutural margin in large part straight, in distal third obliquely sub-arcuate to the apex, which is nearer the costal than the major portion of sutural margin: marginal field moderately broad, relatively

¹See p. 11, footnote 1.

elongate; scapular field very broad, at faintly proximad of middle of tegmen being broader than discoidal field at same point; anal field elongate pyriform, equal to slightly more than two-fifths of tegminal length: costal veins fifteen in number, largely straight oblique in direction, the distal five being rami of the preceding costal vein; discoidal sectors longitudinal, principals numbering five, two of which are bifurcate distad; ulnar vein, here counted as a discoidal sector, of the usual blattellid type; axillary veins five in number. Wings moderately elongate, greatest width contained one and two-thirds times in greatest length of same; costal margin straight in the region of the costal veins, arcuate distad to the narrowly rounded rectangulate apex, area of the axillary vein with margin weakly but appreciably arcuate: intercalated triangle small, but distinct, its greatest length about one-seventh of length of wing on axis of anal vein: clavate costal veins seven in number, strongly oblique, the clavations elongate and marked, non-clavate costal veins seven in number, on distal multiramosé rami of the discoidal vein: medio-discoidal area subequal in width to medio-ulnar area, with numerous (fourteen plus) cross-veins forming subquadrate areolets; medio-ulnar area without complete cross-veins; ulnar vein triramosé, all complete; axillary vein triramosé on peripheral side.

Abdomen strongly depressed, deplanate; dorsal surface unmodified except for slight median fold distad on penultimate tergite: supra-anal plate transverse, moderately arcuate produced mesad, a faint suggestion of median emargination present: cerci composed of ten segments, elongate, slightly fusiform, depressed, very slender distad: subgenital plate broad at base and produced meso-distad into a shute-like process, which is as long as the remainder of the plate, into which, by the diverging, concave lateral margins, it passes; distal margin of the median process broadly obtuse-angulate emarginate, rounding laterad; styles inserted at the lateral angles of the median process, large, longer than distal width of median process, falcate distad, the apex recurved spinose, and with two or more similar spines on dorso-lateral surface; genital hook figured.

Cephalic femora slender, straight, subequal, with ventro-cephalic margin bearing "Type A" spination, the proximal spines relatively short, weakly curved; apical spines on ventro-cephalic margin two in number, large, the distal the longer; ventro-caudal margin with five long spines; no dorso-genicular spine present. Median and caudal femora with ventral margins well and regularly armed, decided dorso-genicular spines present. Caudal tarsi very elongate and slender; proximal joint almost twice as long as the remaining joints together, biserially spinose on ventral surface, with a small distal trigonal pulvillus; second joint similarly spined with more extensive pulvillus; third joint¹ with an elongate, acute pulvillus. All tarsi with large arolia; tarsal claws with median section of ventral margin serrulate.

ALLOTYPE.—Female; San Francisco Mountains, thirteen kilometers north of San Cristobal, Province of Santo Domingo,² Dominican Republic, Hispaniola. August 29. (August Busck.) [United States National Museum.]

Characters as in male, except for the following noteworthy differences.

Interspace between eyes very slightly broader than in male.

¹This is really the fourth joint, as this limb has the four- instead of normally five-jointed condition. The opposite tarsus is incomplete, but the allotype shows that the large, elongate pulvillus is that of the fourth joint, while that of the true third joint is of similar size but more rounded, covering less of the joint on account of the greater size of the latter.

²See p. 11, footnote 1.

Tegmina surpassing the apex of the subgenital plate by slightly more than the length of the dorsal surface of the head and pronotum combined; principal discoidal sectors six in number, one or more furcate distad.

Abdomen with fold on penultimate dorsal segment present: supra-anal plate of type found in male but slightly more arcuate and produced, the margin with a decided, broad, obtuse-angulate emargination mesad, the lobes laterad well rounded: subgenital plate broad, broadly produced mesad between the decided cercal emarginations, this production decidedly depressed, its margins laterad slightly curved dorsad, margin of production arcuate with a slight median flattening and a very faint, broad, median tendency toward emargination.

General coloration of the dorsal surface of the body, the head, the disk of the pronotum and a suffusion of the anal and discoidal fields and sutural portion of the scapular field of the tegmina ochraceous-buff (♀) to between ochraceous-orange and ochraceous-tawny (♂). Ventral surface and limbs light ochraceous-buff (♀) to the general color (♂). Head with the occiput and interocular space washed with orange chrome (♂) to apricot orange (♀), a narrow, transverse, weakly arcuate line of light ochraceous-buff present below ocellar spots; upper face weakly washed with color of occiput; eyes mottled fuscous and dresden brown; antennæ with proximal joint of general color, similar distad in female, in male suffused with fuscous, paling distad. Pronotum with broad lateral areas hyaline. Tegmina with marginal field and costal portion of discoidal field hyaline; normally covered section of right tegmen distinctly infusate in male sex. Wings of male rather heavily infusate, particularly the distal section of the axillary field and the periphery of the infusate portion of the anterior field; principal and radiate veins heavily infusate; area of the clavate portions of the costal veins and narrower margin extending about to the apex and to the intercalated triangle, yellow ocher. Wings of female with infuscation evident only in radiate field and there much weaker than in male, remainder with weak ochraceous wash, the veins of that portion pencilled with yellow ocher, those of radiate field weakly pencilled with fuscous, no clearly cut yellow ocher border present. In female sex the supra-anal plate and distal margin of distal tergite (allotype) or the greater portion of distal tergites (paratype) are washed with mummy brown.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, type.....	10.2	2.5	3.5	11	3.4 mm.
♀, allotype.....	9.7	2.6	3.5	11.4	3.4
♀, paratype.....	9	2.6	3.6	11	3.3

In addition to the type and allotype we have before us a paratypic female, bearing the same data as the type and from the same collection. The only features of variation noted in the three specimens which call for comments are; that in the allotype the clavate costal veins of the wings number eight, in the paratypic female the non-clavate wing costal veins number five, and the ulnar vein of the wing possesses four rami, the extra one short and close to the end of the vein.

PSEUDOSYMPLOCE, new genus

This genus belongs to that aggregation of genera of the *Ischnoptera* possessing biseriate or "Type B" spination on the ventro-cephalic margin of the cephalic femora, although it has a strong general resemblance to *Symploce*, which belongs in the uniseriate or "Type A" section of the group. The other American genera with which it would be associated are *Parcoblatta* Hebard, *Ischnoptera* Burmeister and *Nelipophygus*, here described. The structure of the male abdomen is distinctive, its dorsal surface being but weakly specialized on the sixth tergite, with the caudo-lateral angles of the tergites simple, while the supra-anal plate of the same sex shows very marked and characteristic developments. The male subgenital plate and styles are in general similar to the type found in *Ischnoptera*. The divided discoidal vein of the wing strongly suggests the otherwise quite different *Symploce*.

The combination of a divided alar discoidal vein, bilobulate metanotum, hardly specialized sixth and seventh abdominal tergites in the male, a deeply emarginate male supra-anal plate with a pair of digitiform appendages and biseriate spination of the ventro-cephalic margin of the cephalic femora may be said to be characteristic of the genus.

GENERIC DESCRIPTION.—Fully winged in both sexes. Interocular space equal to (♀) or distinctly less than (♂) occipital depth of eye. Head pyriform in outline. Palpi with fifth joint nearly one and one-third times as long as fourth joint. Pronotum weakly transverse, trapezate-ovate in outline; distinct diverging impressions on disk; lateral portions of pronotal disk deflexed. Tegmina and wings surpassing apex of abdomen. Discoidal sectors of tegmina longitudinal; discoidal vein of tegmina bifurcate. Wing with distinct but small intercalated triangle; costal veins of wing non-clavate; discoidal vein of wing bifurcate: ulnar vein with three complete and three to five incomplete rami; axillary vein triramosa. Caudal margin of metanotum with a pair of median, diverging semi-membranous digitiform lobules, much as in *Pseudoderopeltis*. Median segment unspecialized. Sixth abdominal tergite of male but slightly specialized. Supra-anal plate of male emarginate mesad: subgenital plate of female entire. Cephalic femora with ventro-cephalic margin armed with "Type B" spination, i. e., a number of large proximal spines, followed distad by a sharply differentiated series of spinulations, at apex of same margin are three large spines. Tarsi five jointed: caudal metatarsus larger than remaining joints; pulvilli on four proximal joints apical; arolia present: tarsal claws equal, non-specialized.

GENOTYPE.—*P. schistopyga*, new species.

The genus is known to us from Jamaica and Hispaniola and probably it also occurs in Cuba, as a species described from that island by Bolivar as *Ischnoptera excisa* appears to be a member of the present group. However, without material we cannot place the Cuban insect in a key, so

the one presented below is based solely on the species before us. We have given on a subsequent page (p. 108) some comments on *excisa*, drawn from Bolivar's description.

The two species before us are distinguishable as follows.

- Form more robust. Supra-anal plate of male having its median emargination no broader than deep, its greatest median width distinctly less than its lateral length, including total length of lateral process; latter more robust and separated from cercal alveoli by an intervening section of margin of the plate. Subgenital plate of male with median section less produced; styles short and less elongate. (Hispaniola.) *elongata* (Beauvois).
- Form more slender and elongate. Supra-anal plate of male having its median emargination much broader, wider than its lateral length, including total length of lateral process; latter less robust and in contact with cercal alveoli. Subgenital plate of male with median section more produced; styles more elongate. (Jamaica.) *schistopyga*, new species.

***Pseudosymptloce elongata* (Beauvois)**

Plates VII, Figures 14 to 17; IX, Figures 1 to 4

Blatta elongata BEAUVOIS, 1805, 'Ins. Rec. Afr. Amér.,' p. 183, Orth. Pl. ib, fig. 5. Apparently ♂; Santo Domingo.

HISPANIOLA.—Port-au-Prince, Haiti, elevation about 300 feet, I, 15–23, 1922, (F. E. Watson), 2♂; III, 21–29, 1922, (F. E. Watson), 1♀; 1910, (G. Lion), 1♂, [Hebard Collection]. San Francisco Mountains, thirteen kilometers north of San Cristobal, Province of Santo Domingo,¹ Dominican Republic, IX, 1905, (A. Busck), 1♂, [U. S. N. M.]. San Lorenzo, Province of Samaná,² Dominican Republic, VI, 27–29, 1915, (Watson; taken at light), 1♀.

Allowing for the roughness of the figure and the lack of definiteness in the description, we feel convinced that Beauvois had before him a member of this genus, and in all probability the present species, which is the only one of the genus known from Hispaniola.

In order, however, that the student may have a clear idea of the insect as we understand it, a full description of a male and a female are here given, together with figures of the salient features, measurements and color features.

Elongata is compared with *P. schistopyga* on a subsequent page. The above key summarize the chief diagnostic features of the species.

DESCRIPTION OF MALE.—San Francisco Mountains, thirteen kilometers north of San Cristobal, Province of Santo Domingo, Dominican Republic, Hispaniola. September, 1905. (A. Busck.) [United States National Museum.]

¹See p. 11, footnote 1.

²See p. 26, footnote 2.

Size medium; form similar to that of *Ischnoptera rufa*, but more elongate and not as robust as is usual in *Symptloce*; surface weakly polished, tegmina subcoriaceous.

Head narrowly visible cephalad of pronotum when viewed from dorsum; occipital line arcuato-truncate when viewed from the dorsum; least occipital interspace between eyes narrow, not more than two-thirds of occipital depth of eye, moderately concave on each side by the arcuation of the eye outline; interspace between the ocellar spots faintly greater than least width of interocular space; ocellar spots prominent, large, in outline subtrapeziform; outline of head pyriform; greatest width slightly less than greatest length, eyes not projecting, continuing regular outline; face faintly arcuate in profile. Palpi with third joint of medium build, slightly arcuate; fourth joint two-thirds as long as third joint, moderately infundibuliform, apex obliquely truncate; fifth joint about one and one-third times as long as the fourth joint, lanceolate, regularly narrowing in the distal two-thirds. Eyes very strongly reniform in basal outline, the width ventro-caudad about one-half that dorso-cephalad. Antennæ surpassing the apex of the abdomen; joints very numerous, those proximad, except for proximal two, very short.

Pronotum moderately transverse, the greatest length contained about one and one-quarter times in greatest width, in outline trapezate-ovate, with the greatest width slightly caudad of the middle: cephalic margin arcuate, roundly passing into the caudad diverging, oblique, arcuato-truncate lateral margins, which from the rounded point of greatest width are convergingly weak arcuate to the caudo-lateral angles, which are rounded obtuse; caudal margin faintly produced mesad, as a whole gently arcuate; all margins cingulate. Disk of pronotum with distinct, straight, cephalad diverging impressions on caudal half. In section the disk of the pronotum is deplanate caudad, moderately arcuate cephalad; lateral sections appreciably deflexed, the immediate vicinity of the lateral margins narrowly subreflexed.

Tegmina surpassing apex of abdomen by approximately the pronotal length, elongate, subequal lanceolate, greatest width of tegmina contained nearly three and one-half times in greatest length of same: costal margin moderately arcuate in region of marginal field, straight for greater portion of scapular field and rather sharply and abruptly rounded distad to the rounded, weakly obtuse-angulate apex, which is somewhat nearer costal than sutural margin; sutural margin straight, with a relatively short and oblique subtruncate arcuation to apex. Marginal field of medium width, relatively short; scapular field occupying less than two-fifths of total tegminal width; anal field elongate pyriform, its greatest width contained two and one-half times in greatest length of field. Costal veins of tegmina twenty-one in number, strongly oblique; discoidal vein bifurcate at three-fifths of length of tegmen from base, sutural fork simple, straight; discoidal sectors longitudinal, eight in number inclusive of ulnar vein and exclusive of sutural fork of discoidal vein; axillary veins seven in number; intercalated false veins prominent. Wings large, greatest width contained one and two-thirds times in greatest length of same; costal margin weakly arcuate in the region of the costal veins, the apex of the wing rounded, weakly obtuse-angulate; axillary region much shorter than anterior field; intercalated triangle evident but small, elongate, in length contained five and one-half times in length of wing along anal vein. Costal veins of wings twenty in number, including mediastine vein, the distal ones largely bifurcations of rami of the discoidal vein, oblique, non-clavate; discoidal vein bifurcate slightly distad of middle; medio-discoidal area subequal in width to medio-ulnar area, divided into relatively regular quadrangle areolets; ulnar

vein with three complete and three incomplete rami; axillary vein with three rami, all diverging proximad of middle and the first little removed from the basal arch.

Abdomen with dorsal surface concave, appreciably upcurved laterad; median segment simple: tergites one to seven with caudo-lateral angles rectangulate; distal margin of tergites one and two in general truncate, slightly sinuate near lateral angles; distal margin of tergites three to five faintly to appreciably arcuate-emarginate mesad; tergite six with margin subtruncate, briefly and shallowly emarginate mesad; surface of tergites two to six with a faint, incomplete median carina, laterad of the carina these segments have numerous short, irregular and often weak, carinulations or folds; seventh tergite hidden under the specialized sixth, moderately produced laterad into bluntly rectangulate lobulations; eighth tergite much narrower than sixth, the margin broadly and deeply obtuse arcuate-emarginate. Supra-anal plate transverse, distal margin bearing a pair of moderately converging digitiform processes, which in length are equal to that of plate itself, and are separated by a diastema subequal to distance from mesal side of base of process to lateral margin of plate; median diastema arcuato-truncate, an appreciable excision of plate; digitiform processes blunt at apex, ventral surfaces with heavy brushes of long adpressed, agglutinated hairs. Cerci elongate, subfusiform, tapering in distal two-thirds; dorsal surface deplanate, ventral surface with segments individually nodose. Subgenital plate asymmetrical, the margin, from sinistral to dextral side, showing first an oblique truncation to mesad of sinistral style, then a rectangulate projection carrying the dextral style to its apex, then a strongly oblique subtruncate arcuation dextrad: styles short; the left, simple, tapering and moderately decurved; the right, incrassate, hardly tapering, incurved and decurved, the apex with a group of spiniform teeth.

All femora appreciably compressed. Ventro-cephalic margin of cephalic femora with "Type B" spination, the proximal large spines six in number, the distal two decreasing in length, these large spines with a row of minute serrulations on their distal faces; distal series of minute spinulations with numerous and closely placed components; apical spines of ventro-cephalic margin three in number, the two distal ones much longer than the other; ventro-caudal margin of cephalic femora with four spaced spines. Median and caudal femora well spined beneath. Caudal tarsi slender, metatarsus slightly longer than remaining joints united; ventral surface of three proximal joints biseriate spinulose; pulvilli apical and subtrigonal.

DESCRIPTION OF FEMALE.—San Lorenzo, Province of Samaná, Dominican Republic, Hispaniola. June 27 to 29, 1915. (Watson; taken at light.) [American Museum of Natural History.]

Differing from the description of the male sex in the following features.

Interspace between eyes approximately subequal to occipital depth of eye; interspace between ocellar spots subequal to least width of interocular space.

Pronotum with diverging depressions of disk of pronotum less evident than in male.

Tegmina with greatest width contained three and one-fifth times in greatest length of same; costal veins twenty-three in number, formed as in male; discoidal vein furcate at middle.

Abdomen with dorsal surface unmodified and non-specialized. Supra-anal plate transverse, broadly arcuate produced mesad and there with a decided arcuate-angulate emargination. Subgenital plate large, deplanate, the distal margin truncato-arcuate between the cercal bases.

Cephalic femora with ventro-cephalic margin having as many as nine of the large proximal spines, these in decreasing length distad, but sharply cut off from the spinulations.

General color of dorsal surface raw sienna with a touch of orange-rufous, the dorsal surface of the abdomen washed with raw umber. Head with region dorsad of antennal bases and occiput claret brown to maroon; lower face and palpi raw sienna; eyes antique brown blotched with fuscous; antennæ of the dorsal color, washed with raw umber proximad, except on the two proximal segments. Pronotum with disk more opaque than remainder, but uniformly colored. Tegmina with marginal field more hyaline than remainder of tegmina. Wings hyaline, slightly washed distad and more solidly in the region of the costal veins with brussels brown; veins pencilled in raw umber. Abdomen with the disto-dorsal section and the cerci approaching deep bay. Coxæ and femora raw sienna; tibiæ bay or very deep bay, the spines burnt sienna; tarsi bay proximad, regularly paling to weak antique brown (♂) or auburn (♀) distad. Venter of abdomen antique brown or amber brown, slightly darkening laterad, and distad passing into deep bay.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, San Francisco Mountains, Domini- can Republic.....	11.7	3.4	4.2	14.2	4.1 mm.
♂, Port-au-Prince, Haiti.....	14.6	4.1	4.9	16.5	4.6
♂, Port-au-Prince, Haiti.....	14.5	3.7	4.6	15.2	4.8
♀, San Lorenzo, Do- minican Republic	11.5 ¹	4.2	5.6	16	4.7
♀, Port-au-Prince, Haiti.....	15.5	4.9	5.1 ²	16.9	4.6

The measurements given above show the extent of individual variation in size found in the series. The interspace between the eyes is occasionally as narrow as one-half of the occipital depth of the eye in the male sex; the number of costal veins of the tegmina ranges from as great as twenty-one (♂) and twenty-three (♀), as given in the description, to as low as sixteen (♂) and eighteen (♀); the point of bifurcation of the discoidal vein of the tegmina varies so that it is occasionally in the middle of the length of the vein, while the number of discoidal tegminal sectors may be as great as nine. The costal veins of the wing may number as few as sixteen, while the incomplete rami of the ulnar vein of the wing

¹Abdomen somewhat twisted; length less than in life.

²The pronotum is less deplanate in this than in the other female measured, the condition in the latter, in our opinion, being hardly the normal transverse contour of the pronotum.

may be as many as five. The ventro-cephalic margin of the cephalic femora has the proximal group of spines ranging in number from five to eight, in the case of one male showing these extremes on the pair; the number of spines on the ventro-caudal margin of the cephalic femora varies from three to four, the former number, however, present only on one limb in a single male. The median emargination of the distal margin of the sixth tergite is less pronounced in the other males than it is in the one described, while the second female has the median emargination of the supra-anal plate smaller than in the one described, being in fact a mere shallow obtuse-angulate emargination.

The species is evidently of wide distribution in the island, as the records here given show. Beauvois states it occurs in woods.

***Pseudosymploce excisa* (Bolivar)**

Isch[noptera] excisa BOLIVAR, 1888, Mém. Soc. Zool. France, I, p. 124. ♂, ♀; Cuba.¹

As we have stated above we feel confident the present species will be found to be a member of the genus *Pseudosymploce*. Its differences from *P. elongata*, as far as can be determined from the original description, are: the much greater size, the emargination of the supra-anal plate of male filled with whitish membrane, the excision of the lateral processes of same plate each with a single apical point, and the absence of black from the base of the discoidal vein of the tegmina.

The occurrence of this species in the mountainous region of eastern Cuba and of *P. elongata* in the mountains of Hispaniola is suggestive. The Jamaican species of the genus is also known to reach a considerable elevation in that island. The possibility of the three species being representatives of an ancient fauna, probably absent from much of the lower country, is worthy of consideration. We know nothing of the species aside from the information contained in the original description.

***Pseudosymploce schistopyga*,² new species**

Plate VI, Figures 13 to 15

A close relative of the Hispaniolan *P. elongata*, but differing in its somewhat more slender, elongate form, proportionately broader and shorter head, with somewhat more evident eyes, in the distal margin of the supra-anal plate of the male having its median emargination much broader, distinctly wider than its depth laterad (including total length of lateral processes), in the lateral digitiform processes of the same plate being less robust and in contact with cercal alveoli (instead of an in-

¹According to Gundlach this material came from Yateras, Oriente.

²From *σχιστός*, divided, and *ρύγε*, rump, in allusion to the character of the male supra-anal plate.

tervening section of the margin being present, as in *P. elongata*), in the somewhat greater production of the median section of the male subgenital plate, and the more elongate styles.

TYPE.—Male; Port Antonio, Portland Parish, Jamaica. December 7. (A. E. Wight.) [Museum of Comparative Zoölogy.]

As this species closely resembles *P. elongata* in a large proportion of its features, the following description is largely comparative with the preceding one of *elongata*.

DESCRIPTION OF TYPE.—Form somewhat more slender than in *P. elongata* and apparently more elongate.

Head with greatest width across eyes contained one and one-sixth times in greatest depth of head; occipital interspace between eyes relatively narrow, but slightly more than half of occipital depth of eye; interspace between ocellar spots equal to about one and one-half times the least width of interocular space; ocellar spots prominent, large, ovato-trigonal in outline. Palpi much as in *P. elongata*.

Pronotum proportionately elongate and narrower than in *elongata*, its general outline more circular, due to cephalic margin being broader and lateral margins somewhat less oblique and faintly more convex; caudo-lateral angles less evident and more rounded; median production of caudal margin faintly more produced.

Tegmina with apex slightly more rounded and less angulate; passage from sutural margin to apex more arcuate and less oblique subtruncate than in *P. elongata*: costal veins eighteen to twenty in number; discoidal vein bifurcate as in *P. elongata*, discoidal sectors as in same. Wings with costal veins totalling fifteen, including mediastine vein in this number, structure and character as in *P. elongata*; ulnar vein with three complete and four incomplete rami.

Abdomen of type damaged in proximal section, so the exact character of those segments cannot be determined; sixth tergite with no evident median emargination, there bearing only a narrow and low carinulate fold of the surface on its distal half; seventh and eighth tergite as in *elongata*. Supra-anal plate with median emargination proportionately far broader than in *elongata*, but little less than half as wide as entire plate at broadest point, and more than one and one-half times as broad as its lateral depth including total length of marginal digitiform process, margin at bottom of emargination biconcave; digitiform processes proportionately shorter, more slender and more decidedly twisted than in *P. elongata*, flattened on their oblique lateral surfaces, lateral bases of processes in contact with cercal alveoli. Subgenital plate slightly more produced rectangulate mesad; styles appreciably longer, dextral one decidedly so and more tapering distad. Ventro-cephalic margin of cephalic femora with large spines of proximal group numbering five to seven, in the latter the two distad very distinctly smaller than the others of this category, spination of remainder of margin as in *elongata*; ventro-caudal margin of cephalic femora with three to four spines.

ALLOTYPE.—Female; Pleasant Hill, Blue Mountains, Jamaica. Elevation, 3660 feet. July 23, 1923. (Rehn; attracted to light in house at night.) [Academy of Natural Sciences of Philadelphia.]

The following characters are solely those of noteworthy difference from the preceding description of the male sex.

Size appreciably larger. Head with occipital interspace between eyes slightly greater than occipital depth of eye; interspace between ocellar spots slightly less than least width of occipital interspace.

Supra-anal plate much as in *P. elongata*, but with median emargination of the margin much less evident and distinctly smaller.

Cephalic femora with large spines of proximal group of ventro-cephalic margin numbering from two to five.

General impression of color tone of dorsal surface is from sanford's brown (♀) to between sanford's brown and auburn (♂) (of Ridgway), the tegmina, however, when viewed by transmitted light are seen to be near buckthorn brown in color. Head chestnut, with lower margin of face, clypeus, lower border of genæ, and mandibles occasionally (♂) pale zinc orange; eyes chestnut brown to raw umber clouded with fuscous; ocellar spots dull orange-chrome; palpi with ultimate and penultimate joint weakly (♀) or distinctly (♂) washed with bay; antennæ auburn, paling slightly distad, two proximal joints weakly chestnut. Pronotum slightly paler cephalo-laterad, there approaching orange-rufous. Tegmina with proximal portion of humeral trunk and anal sulcus weakly pencilled with auburn. Wings with veins and wash in region of costal group auburn. Dorsum of abdomen argus brown (♂) to sudan brown (♀), darkening distad; venter of abdomen ochraceous-tawny meso-proximad, becoming argus brown distad and laterad, passing to raw umber on the subgenital plate, cerci and styles. Coxæ and femora buckthorn brown (♀) to dresden brown (♂); tibiæ chestnut to bay, tibial spines burnt sienna; tarsi proximad of the same color as the tibiæ, paling distad to ochraceous-tawny.

MALE.—Length of body, 15.5¹ mm.; length of pronotum, 3.4; greatest width of pronotum, 4.1; length of tegmen, 15; greatest width of tegmen, 4.

FEMALE.—Length of body, 15.5 mm.; length of pronotum, 3.9; greatest width of pronotum, 4.6; length of tegmen, 17.5; greatest width of tegmen, 5.1.

The type and allotype are the only specimens of this species we have seen. The species apparently has a considerable vertical range in Jamaica, occurring from near sea-level to over thirty-six hundred feet elevation.

ISCHNOPTERA Burmeister

At one time considered to be a genus of virtually world-wide distribution within the tropics and subtropics, the genus *Ischnoptera* is now known to be of much more restricted distribution, probably being largely peculiar to tropical and subtropical America, with a very few species entering the temperate portions of both North and South America. The bulk of the Old World species previously assigned to *Ischnoptera* have not been examined in the light of present day knowledge of the genus, chiefly secured from its genotype (*I. morio* Burmeister), but such examinations as have been made show genera other than true *Ischnoptera* to be represented. The clarification of this situation as far as carried out to date, has been presented in several papers of the present authors.²

¹This length is practically an estimate, as the abdomen had been detached from the type and several proximal segments had been destroyed or badly damaged. In consequence this figure represents a total of the two pieces and an allowance for lost segments. It may be entirely too great and is certainly not too small.

²M. Hebard: 'Studies in the Group Ischnopterites' (1916, Trans. Amer. Entom. Soc. XLII, pp. 337-383); 'The Blattellæ of North America, North of the Mexican Boundary' (1917, Mem. Amer. Entom. Soc., No. 2, pp. 60-62, 70-74, 149-151). J. A. G. Rehn: 'Contributions to our Knowledge of the Dermaptera and Orthoptera of the Transvaal and Natal' (1922, Annals of the Transvaal Museum, IX, part 1, pp. 23-25).

While numerous species of *Ischnoptera* occur in South America and Central America, but four representatives of the assemblage have been seen from the West Indies, one a geographic race of a species the range of which nearly encircles the Gulf of Mexico and the Caribbean Sea, a second more nearly related to Andean forms and probably limited in distribution to the Blue Mountains of Jamaica, and a third and fourth belonging to the very diverse tropical American *Rubiginosa* Group of the genus, one of these being Cuban (and probably as an adventive Hispaniolan), the other known only from the Blue Mountains of Jamaica. Very probably the first mentioned form, *I. rufa rufa*, is a relatively recent arrival, a vigorous stock of marked adaptability which has penetrated most of the low-lying country within its general range: the other three species seem to be representatives of a more ancient fauna, of which the Jamaican forms are known only from the higher mountains, while the Cuban one is more generally distributed. This latter fact has an added significance when it is noted that *I. rufa rufa* is not known from Cuba.

KEY TO WEST INDIAN SPECIES OF *Ischnoptera*¹

1. Form relatively robust; pronotum proportionately of large size. Supra-anal plate of male not markedly produced mesad and distal margin undivided. Styles of male subgenital plate markedly unsymmetrical in position and unequal in development. (Size medium.) (Probably entire West Indies except Cuba.) *rufa rufa* (DeGeer).
 Form more elongate; pronotum proportionately of smaller size (particularly in *I. podoces*). Supra-anal plate of male with distal margin divided and sometimes markedly produced mesad (*ligula*). Styles of male subgenital plate not markedly unsymmetrical in position and subequal in development except in *I. ligula*. (Size medium to small.) 2.
2. Size medium. Pronotum proportionately larger. Tegmina more ample in proportion to general bulk. (General facies considerably resembling *Pseudosymploce*.) (Jamaica.) *podoces*, new species.
 Size small. Pronotum proportionately larger. Tegmina less ample in proportion to general bulk. 3.
3. General coloration dark; head, disk of pronotum, much of tegmina and dorsum of abdomen dark brownish. Supra-anal plate of male not markedly produced. Styles of male subgenital plate similar in development. (Jamaica.) *oreochares*, new species.
 General coloration ochraceous, with little or no dark brownish. Supra-anal plate of male markedly produced mesad. Styles of male subgenital plate dissimilar in development. (Cuba and Hispaniola.) *ligula*, new species.

¹Two species of the genus have been described from the West Indies, which are not here treated under *Ischnoptera*. These are *I. excisa* Bolivar (1883, Mém. Soc. Zool. France, I, p. 124), and *I. adusta* Caudell (1905, Canad. Entom., XXXVII, p. 237). The former we have reason to believe is a member of the new genus *Pseudosymploce*, under which it is discussed, while the latter is a *Neoblattella*, and as such is treated in this paper. *Ischnoptera parrula* of authors, as recorded from Cuba, is not the South American insect originally described under that name by Saussure, but is the species here described as *I. ligula*.

***Ischnoptera rufa rufa* (DeGeer)¹**

Blatta rufa DEGEER, 1773, 'Mém. Hist. Ins.,' III, p. 539, Pl. XLIV, fig. 7. Surinam.

JAMAICA.—Montego Bay, St. James Parish. Palm Beach, Montego Bay. Mandeville, Manchester Parish, elevation 2131 feet, XI, 24–26, (F. E. Watson; in hotel), 1♂, 1 immat. ♂. Liguanea Plain, near Kingston, VII, 5, 1920, (R. and H.; under limbs and leaf litter in mangrove swamp), 1♂, 1♀, 1 immat. ♀, [Hebard Cln. and A. N. S. P.].

HISPANIOLA.—Sanchez, Province of Samaná, Dominican Republic. Moca, Prov. Pacificador, Dominican Republic, I, 1922, (E. Kaempfer), 1♀, [A. N. S. P.].

PORTO RICO.—Arecibo, Department of Arecibo. Ensenada, Guanica Harbor, Department of Aguadilla.

ST. CROIX.—Eveques Valley.

DOMINICA.—Roseau. No exact locality.

BARBADOS.—No exact locality.

We have given simply the locality information for the records from the West Indies, tabulated by Hebard in his analysis of the forms of this species,¹ adding solely the new material examined. Typical *rufa* is now known to occur probably throughout the West Indies exclusive of the Bahamas and Cuba, on which islands it has never been encountered. Brunner has recorded what is probably this subspecies from Grenada as *I. occidentalis*, which name belongs to a race of the present species found on the mainland of Central America and Mexico.

Outside of the West Indies the typical form of the species apparently occurs across northern South America, being known from British and Dutch Guiana, and in Central America from Panama. For detailed information regarding this species and its geographic forms see two recent studies by the junior author.²

The male from the Liguanea Plain is of particular interest as it has the interocular space as broad at the occiput as in the average female, the area being somewhat greater than the occipital depth of the eye. The interocellar space is also quite broad, being but very faintly narrower than the interocular space. The genital features of the individual are typical of the subspecies.

The dates of occurrence for the West Indian material of this form cover from early March to early November, and it would seem to be found adult throughout the year. The species is an adaptable one, being

¹See Hebard, 1916, Trans. Amer. Entom. Soc., XLII, pp. 346–354.

²Loc. cit.: 1920, Mem. Amer. Entom. Soc., No. 4, pp. 70–72.

found in a variety of situations, although none of the material of the present race was taken in forest conditions. While hardly a domiciliary form it would seem to frequent environments where man has considerably disturbed natural conditions, as under débris, docks, under logs and stones in cultivated areas. It also has been taken hiding under litter on limestone areas and attracted to lights.

The fact that this species would seem to be regularly distributed from Hispaniola and Jamaica around the curve of the Antilles to the coast of South America, but at the same time absent from Cuba, is of considerable significance in the study of the history of the West Indian blattid fauna.

***Ischnoptera oreochares*,¹ new species**

Plate VIII, Figures 6 to 11

This dark colored species, of small size, belongs to the *Rubiginosa* Group, which is greatly and diversely developed in continental tropical America. The present species and the quite different Cuban *I. ligula*, here described, are the only West Indian forms we are placing in the group, which, however, may need further subdivision and regrouping when we are better acquainted with a number of species in hand but at present undescribed. The Cuban *ligula* stands apart from the dark colored species in a number of features, discussed elsewhere, but *oreochares* has more the general fascies of the continental species, although the genitalic features are quite distinctive.

We have compared this new species with a number of members of the *Rubiginosa* Group, particularly with those to which it shows affinity in certain features, i. e., *I. panamæ* Hebard and *nana* Saussure and Zehntner of Central America and *rubiginosa* Walker of the Guianas and northern Brazil. The virtually symmetrical male subgenital plate and subequal styles of *oreochares* are very different from the markedly asymmetrical and contorted male subgenital plate of *rubiginosa*, which latter species, however, has a more general resemblance to *oreochares* in coloration and wing form. The new species is larger than any of the species with which we are comparing it. Saussure and Zehntner's *nana* has much shorter body and tegmina, with rather long incrassate costal-veins of the wings, and the supra-anal plate of the male is less produced and apparently with a different structure of its apex. The feature which does most definitely suggest relationship with *nana* is that the styles of the male subgenital plate of the latter are said to be normal, which would be in practical accordance with the condition found in *oreochares*.

TYPE.—Male; Pleasant Hill, Blue Mountains, Jamaica. Elevation, 3660 feet. July 29, 1923. (Rehn; attracted to light in garden.) [Academy of Natural Sciences of Philadelphia, Type No. 5420.]

DESCRIPTION OF TYPE.—Size relatively small (length of body, 11.9 mm.); form moderately slender and elongate; surface of body but moderately polished.

Head with occipital interspace between eyes very broad, about equal to occipital depth of eye; interspace between ocellar spots very faintly greater than that between

¹From *ὄρεος-χαρής*, delighting in the hills.

eyes, shape of spots ovoid, these set obliquely, size medium. Palpi with penultimate joint short, not more than two-thirds as long as antepenultimate joint, infundibuliform; ultimate joint nearly twice as long as the penultimate joint, large, virtually lanceolate in lateral outline, as seen in extensor aspect hardly compressed.

Pronotum subtrapezoid in outline, not markedly transverse, greatest length contained one and one-fourth times in greatest width, which is at three-fifths the length from cephalic margin; cephalic margin moderately convex, broadly passing laterad into the moderately diverging, slightly arcuate lateral margins; lateral angles very broadly rounded and passing caudad to the obtusely rounded caudo-lateral angles; caudal margin equal to approximately three-fourths the width of pronotum at broadest point, arcuato-truncate; surface of dorsum of pronotum with moderately indicated and relatively broad diverging impressions, which are placed slightly caudad of the middle; lateral portions of pronotum appreciably deflexed, rather narrow, very broadly rounding to dorsal surface, which in transverse section is gently arcuate cephalad of the impressions, more deplanate caudad.

Tegmina elongate, surpassing apex of abdomen by slightly more than one and one-half times pronotal length, lanceolate, narrow, greatest width contained about three and three-fourths times in greatest length of same, venation relatively conspicuous, moderately elevated: costal margin moderately oblique truncato-arcuate in proximal fourth, thence straight but briefly rounding to the non-angulate apex; sutural margin more broadly rounding to apex than costal margin: marginal field relatively small, narrow, short, not reaching as far distad as apex of anal field; scapular field very largely of uniform width; anal field elongate subpyriform, reaching nearly to two-fifths of length of tegmen: costal veins twenty-three in number, certain of the distal ones made by bifurcation; discoidal sectors nine to ten in number; anal vein slightly sigmoid in distal half; axillary veins six in number. Wings with greatest width contained about one and one-half times in greatest length of same; anterior field appreciably produced distad of radiate field, apex marked but well rounded: costal veins simple, oblique, non-clavate, twenty in number and more spaced distad than elsewhere; ulnar vein with three complete and three incomplete rami; medio-discoidal field at widest point nearly half again as wide as medio-ulnar field, former with numerous transverse nervures forming generally subquadrate areolets, latter field with a fewer number of incomplete transverse nervures from costal side of ulnar vein; intercalated field relatively small and narrow.

Dorsum of fifth abdominal tergite with distal margin obtuse-angulate emarginate mesad, rounding off lateral into the more truncate lateral sections of margin, surface of plate proximad of emargination longitudinally bi-impressed on each side of a low and weak median fold: sixth evident tergite with caudo-lateral angles moderately acute produced; distal margin of segment very broadly obtuse-angulate emarginate, immediate angle of emargination slightly rounded excavate: seventh evident tergite narrowly visible, not projecting laterad, bearing mesad a broad, low, elevated fold, which is flanked laterad by the usual comb-like appendages extending from between this and preceding segment: eighth evident tergite with distal margin broadly and completely concave, lateral angles acute. Supra-anal plate slightly distorted in type in drying, but natural form quite evident, distal section moderately produced, narrowing distad, linguiform, lateral margins of production biconvex to distal margin, which is broadly rounded with a slight and shallow median emargination, distal section of production with numerous radiating chaetæ. Subgenital plate but slightly asym-

metrical, greatest (proximal) width about one and one-third times the greatest median length; sinistral margin to base of sinistral style shallowly concave, the margin regularly thickening distad to stylar base; dextral margin as seen from venter nearly straight for more than proximal half, thence obliquely truncate to base of dextral style; interstylar portion of margin concave, this and adjacent lateral sections well supplied with short, erect chætæ, internal surface of same region thickly clothed with adpressed spinulæ: styles simple, small, short, thick, subequal, placed in relatively the same positions on plate, distal extremity with a few massed short spinulæ: ventral surface of subgenital plate transversely deeply impressed in distal third. Cerci relatively robust, subequal in width in proximal two-thirds, tapering bluntly distad, dorsal surface depressed and deplanate. Anal orifice as seen in caudal aspect shows chiefly: extending ventrad from dextro-proximal section of ventral margin of subgenital plate a large inflated reniform appendage; extending caudad from sinistral side a large inflated, moderately acute production, with many adpressed hairs and several groups of agglutinated spiniform chætæ at apex.

Cephalic femora with proximal group of large spines on ventro-cephalic margin two to three in number, in the latter case the distal one is smaller than the other; spinulations between the proximal and distal groups of large spines on same margin numerous, becoming exceedingly short distad; ventro-caudal margin of cephalic femora with a single median spine in addition to the usual distal one. Caudal metatarsus slightly longer than remainder of tarsus.

ALLOTYPE.—Female; Cinchona, Blue Mountains, Jamaica. Elevation, 4900 feet. July 29, 1923. (C. C. Gowdey.) [Academy of Natural Sciences of Philadelphia.]

DESCRIPTION OF ALLOTYPE.—Differing from the above description of the type in the following noteworthy features.

Size, form, and surface as in male.

Head with occipital interspace between eyes slightly broader, equal to one and one-fifth times the occipital depth of eye; interspace between ocellar spots slightly less than that between eyes at occiput.

Pronotum in general form slightly more transverse, greatest length contained one and one-third in greatest width; caudal margin faintly more angulate mesad than in male. Disk impressions much less marked than in male, hardly evident.

Dorsum of abdomen with tergites unmodified, as usual in female sex. Supra-anal plate arcuate trigonal, greatest proximal width slightly less than twice median length, margin arcuate with faint median truncation distad; surface with a transverse concave arcuation connecting the regions at the cercal bases. Subgenital plate large and broad, moderately transverse, margin very broadly and regularly arcuate.

Cephalic femora with ventro-cephalic margin having as many as four (three on one limb) spines in proximal group.

General color of dorsal surface kaiser brown (male) to prout's brown (female), lateral sections of pronotum and narrowly the cephalic margin dull ochraceous-orange, an intimation of the same pale color found in the marginal field and along the costal margin of at least a portion of the scapular field in the female. Head blackish chestnut brown, in the male passing to ferruginous in the buccal region. Palpi of male pale zinc orange, of female largely of the color of the head touched with ochraceous. Eyes blackish (male) to mummy brown (female). Antennæ ochraceous-tawny, washed with zinc orange (male) to prout's brown (female). Pronotal disk somewhat clouded with fuscous, this on cephalic section in male, more general and deeper but cloudy and

irregular in the female, in both sexes appreciably divided in two by an indefinite medio-longitudinal pale bar. Wings infumate with pale bister, veins pencilled with prout's brown, a cloud of latter in costal region. Dorsum of abdomen distad and laterad mummy brown, paling meso-proximad to dresden brown (female) or buckthorn brown (male). Male supra-anal plate narrowly bordered with russet; female supra-anal plate tawny olive. Cerci kaiser brown (male) to mummy brown (female), slightly paler distad. Female with venter of abdomen and coxæ mummy brown; remainder of limbs ochraceous-tawny, the tibiæ and their spines washed with mummy brown. Male with venter of abdomen ferruginous, broadly bordered laterad and distad with mummy brown, distal section of subgenital plate dully ferruginous; limbs of male ochraceous-tawny, tibial spines washed with russet.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Pleasant Hill, type..	11.9	2.7	3.4	12.7	3.4 mm.
♀, Cinchona, allotype..	10 ¹	2.5	3.3	12.2	3.2

The type and allotype are the only specimens of this most interesting species which we have seen. Apparently there is a considerable range of color tone, from the evidence of the type and allotype.

***Ischnoptera ligula*,² new species**

Plate IX, Figures 5 to 7

This species is the one erroneously identified as *I. parvula* by Saussure, Bolivar, Gundlach and Rehn. The latter species is, as far as known, South American, being described from Brazil, and it is quite distinct, as material now in hand shows. The present species is, as far as present knowledge goes, restricted to Cuba and Hispaniola.

The species belongs to the very diverse *Rubiginosa* Group of the genus, all the forms of which are of small size, often similar in general appearance and in coloration, but with very striking and distinctive genital characters. The greatly produced, tongue-like structure of the supra-anal plate of the male in this species is very different from that found in any of the known forms, while the character of the subgenital plate is more suggestive of that of *I. amazonica* Rehn,³ from the Amazonian region, than that of any other form, but the resemblance is not indicative of close relationship. The smaller size, more robust cephalic limbs and greater interspace between the eyes, as well as the absence of an accessory arm on the ventral surface of the male supra-anal plate, will aid in the recognition of the species. The species is in no way closely related to the Jamaican *I. oreochares*, described above.

TYPE.—Male; Havana, Cuba. (C. F. Baker.) [Academy of Natural Sciences of Philadelphia, Type No. 5357.]

¹The rear of the body is bent ventrad and this measurement is actually short of the true length, which could only be estimated.

²A little tongue, in allusion to the form of the male supra-anal plate.

³1916, Trans. Amer. Ent. Soc., XI, II, p. 225, Pl. xiv, figs. 4, 5, 6, 7 and 8.

Size very small; form moderately depressed, elongate elliptical; surface moderately polished.

Head visible cephalad of pronotum, when viewed from dorsal aspect, for almost its entire width: occipital line gently arcuate; interspace between eyes broad, slightly but appreciably greater than the dorso-ventral depth of eye; form of head broad pyriform, the width across eyes slightly less than greatest depth of head, outline of eyes very broadly rounded; face but moderately inflated; ocellar spots large, in outline elongate trapezoidal: palpi robust, as a whole subcompressed; third joint short; fourth joint about two-thirds as long as fourth joint, rather strongly infundibuliform; fifth joint large, nearly twice as long as the fourth joint, in profile acute lanceolate, its proximal depth contained about three times in length, strongly compressed; eyes not at all prominent, in basal outline strongly reniform, narrowing toward the buccal region; antennæ with proximal joint moderately robust.

Pronotum slightly transverse, greatest length contained one and one-fifth times in greatest width, in outline roughly rounded trapezoidal, greatest width placed distinctly but not markedly caudad of the middle of the disk: cephalic margin arcuate, regularly rounding into the oblique subarcuate, cephalad converging cephalic portion of lateral margins: lateral angles broadly rounded, caudal section of lateral margins obliquely subtruncate, the caudo-lateral angles rounded obtuse; caudal margin weakly but distinctly arcuate; all margins finely cingulate: surface of disk with the usual paired ischnopterine oblique depressions weakly indicated and placed at the transverse middle; in transverse section the pronotum is strongly arcuate, the lateral sections appreciably deflexed.

Tegmina elongate, surpassing the apex of the abdomen by almost the pronotal length, the margins subparallel, the greatest width contained three and three-fifth times in the greatest length of same: costal margin moderately arcuate proximad and briefly distad strongly arcuate to the well rounded apex, greater portion of costal margin almost straight; sutural margin straight, distad rounding more broadly to the apex than is the case with the costal margin: marginal field short and relatively broad; anal field very elongate, broad subpyriform, the anal sulcus reaching the sutural margin slightly distad of proximal third: costal veins twenty in number, simple, oblique; discoidal vein straight in greater portion of length, very moderately arcuate proximad; discoidal sectors as a whole longitudinal, those in the vicinity of the anal sulcus somewhat oblique and reaching the sutural margin well before the apex, eight to nine in number, transverse nervures numerous and forming generally quadrate areolets; axillary veins six in number; intercalated veins prominent throughout tegmina. Wings with the costal margin in the region of the costal veins arcuate-truncate, rounding to the broadly subangulate apex; intercalated triangle relatively small, elongate: costal veins numerous (seventeen plus), a number derived from the mediastine vein, oblique, median group faintly elongate clavate, distal ones rarely furcations of a common discoidal ramus: medio-discoidal area appreciably broader than the medio-ulnar area, narrowed distad by the bending back of the discoidal vein, divided into quadrate areolets by relatively regular cross veinlets; medio-ulnar area with fewer cross veinlets, which form oblong rectangular areolets; ulnar vein with two complete and three to four incomplete rami; axillary vein with two rami on peripheral side.

Abdomen markedly depressed, lateral portions reflexed dorsad; dorsal surface of abdomen with antepenultimate tergite (not counting supra-anal plate) markedly

and relatively broad V-arcuate emarginate, exposing a median, well elevated and slightly compressed, rounded fold of the penultimate tergite, the distal margin of which fold is broadly V-emarginate, bordering this fold laterad lay a pair of slender, slightly arcuate digitiform processes, shorter than fold and with acute apices; tergite proximad of supra-anal plate, narrow, margin broadly arcuate emarginate: supra-anal plate transverse proximad and with a produced linguiform process, the dorsal surface of which and the adjacent portion of the transverse proximal section is roundly inflated, the disto-lateral angles of the process rectangulate, curving ventrad under the distal section of the process, which is much arcuate or curled in transverse section, distal margin of process sharply truncate: cerci subfusiform, tapering distad, apex moderately acute, depressed dorsad, arcuate ventrad, composed of eleven joints: subgenital plate relatively large, asymmetrical, dextral margin regularly arcuate to near the median line, the general vicinity of the margin largely reflexed dorsad, mesad the margin is slightly angulate and bears a short, falcate style with acute apex, thence the margin sinistrad is straight oblique for about one-half the length of that portion of the margin, thence broadening sigmoid, the sinistral style about as long as dextral one, straight, the apex with a dorsal spine: genital hook heavy, moderately arcuate at apex but recurved or strongly falcate.

Limbs relatively robust: cephalic femora with "Type B" spination on ventro-cephalic margin, the large proximal spines three in number, the apical spines three in number, the two distal very long; ventro-caudal margin with a single spine, which is mesad: median and caudal femora with both margins regularly but not closely nor heavily spined; caudal tarsi slender, with metatarsus slightly longer than remaining joints combined, ventral surface biserially spinulose, a small apical pulvillus present; second and third joints biserially spinulose ventrad, metatarsus, second and third joints with apical pulvilli: arolia present on all tarsi.

ALLOTYPE.—Female; Cayamas, Oriente Province, Cuba. May 9. (E. A. Schwarz.) [United States National Museum.]

Differing from the description of male sex in the following features.

Size slightly larger; form somewhat more robust.

Tegmina with greatest width contained three and two-fifth times in greatest length of same; marginal field narrower than in male; costal-veins nineteen in number; discoidal sectors seven to eight in number.

Abdomen with dorsal surface hardly modified; antepenultimate tergite with three low, spaced, longitudinal folds on distal half of median third of segment; penultimate tergite narrowly, yet shallowly and broadly, emarginate mesad; tergite proximad of supra-anal plate with a slight trace of a median fold: supra-anal plate transverse, broadly and regularly triangular produced mesad, the apex of the triangle rotundato-truncate, cercal emarginations distinct; subgenital plate moderately large, moderately transverse, appreciably vaulted, margin arcuate with an almost imperceptible flattening mesad.

General color of dorsal surface ranging from pale orange-rufous to bay. Head ranging from burnt sienna to bay; eyes mars brown to fuscous; proximal antennal joint, ocellar spot and palpi pale cinnamon-buff; remaining antennal joints saccardo's umber to bister. Pronotum with disk of the general dorsal color; lateral, cephalic and caudal borders light ochraceous-buff to ochraceous-buff, cephalad this showing a tendency to form a median bar and divide the disk into lateral areas, occasionally, in very intensively colored specimens, the caudal margin is solidly colored with the

disk, and in all the pale lateral borders extend deeply into the disk color along the oblique sulci. Tegmina of the general color, translucent, the right tegmina hyaline where normally covered when wings are closed; marginal field with weak whitish translucence. Wings with weak buffy wash, the principal veins pencilled to a greater or lesser degree with prout's brown; area of the costal veins and apical section of anterior field washed with translucent antimony yellow. Abdomen with dorsal surface of the general dorsal color, infusate, to a greater or lesser extent, in intensive specimens with mummy brown, more pronounced distad and involving the supra-anal plate and cerci. Ventral surface of thorax and limbs pale cinnamon-buff to clay color; ventral surface of abdomen clay color to mars brown, in the latter extreme paling proximad.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Havana, Cuba, type.	8	2.3	2.8	8.7	2.4 mm.
♂, Cayamas, Cuba, paratypes (4).....	8.4 (8-8.9)	2.1 (2-2.2)	2.7 (2.5-2.9)	8.9 (8.5-9.2)	2.6 (2.5-2.9)
♀, Cayamas, Cuba, allotype.....	9.6	2.5	3.1	9.2	2.7
♀, Cayamas, Cuba, paratypes (2).....	8.7 (8.3-9.2)	2.4 (2.4-2.5)	3 (3-3.1)	9.1	2.9 (2.8-3)
♀, Port-au-Prince, Haiti.....	9.5	2.5	3.2	10.2	3.1

In addition to the type and allotype we have before us four males from Cayamas, Oriente Province, Cuba, taken May 9, 17 and 21 and June 1, by E. A. Schwarz, and in the collection of the United States National Museum; two females secured at the same locality and in the same lot, secured May 7 and June 5; and one male from Guantanamo, Oriente Province, Cuba, taken May 22, 1914 by C. T. Ramsden, and in the collection of the Academy of Natural Sciences of Philadelphia. All of these may be considered paratypes. We have also examined two females from Port-au-Prince, Hayti (G. Lion; 1911), belonging to the Paris Museum, which are referable to this species. Quite possibly these may represent an accidental introduction from Cuba.

The species shows much variation in depth of coloration, having intensive and recessive extremes. The large spines proximad in the series on the ventro-cephalic margin of the cephalic femora vary in number from two to four, occasionally showing a variation of one spine in the same individual.

The Port-au-Prince material is somewhat larger than Cuban individuals, but otherwise is not separable from females from the larger island.

This species has been recorded, as *parvula*, definitely from Bemba, Cuba by Gundlach, and from Havana by Rehn. Nothing has been recorded relative to the habits of the insect.

***Ischnoptera podoces*,¹ new species**

Plate VIII, Figures 1 to 5

This interesting species we are tentatively assigning to the *Apolinari* Group of the genus, an assemblage otherwise made up of *I. apolinari* Hebard, *pallipes* (Scudder), *pampaconas* Caudell and *colombiæ* Hebard, all from the Andean region of northern South America. The proportionately small pronotum, slender abdomen and elongate alar appendages point to the group assignment here given, although the nearly symmetrical subgenital plate and styles of the male are features of dissimilarity. These latter features, as well as the emarginate apex of the supra-anal plate of the male, are diagnostic.

TYPE.—Male; Morces Gap, Blue Mountains, Jamaica,² Elevation, 4980 feet. July 28, 1923. (Rehn; in dead leaf litter along trail in forest.) [Academy of Natural Sciences of Philadelphia, Type No. 5419.]

DESCRIPTION OF TYPE.—Size medium, tegmina and wings proportionately large; form slender when alar organs are closed; surface moderately polished.

Head pyriform when seen in cephalic aspect, greatest width across eyes contained one and one-fifth times in greatest depth of head: occipital interspace between eyes relatively broad, slightly wider than occipital depth of eye; interspace between ocellar spots subequal to that between eyes; ocellar spots relatively small, subtrigonal in general outline. Palpi with ultimate joint one and one-fourth times as long as penultimate joint, latter slightly shorter than antepenultimate joint.

Pronotum transverse subtrapezoid in outline, greatest length of pronotum contained one and one-third times in greatest width, which is at two-fifths the length from caudal margin; cephalic margin moderately arcuate, equal to nearly one-half of pronotal width, rounding into the diverging lateral margins, which caudad round over point of greatest width to the evident but broadly arcuate caudo-lateral angles, caudal margin broadly low arcuate with the faintest intimation of median angulation. Surface of pronotum markedly bi-impressed, these diverging.

Tegmina when closed surpassing apex of abdomen by about twice the pronotal length, lanceolate, somewhat broad in proportion, greatest width at distal third and contained slightly less than three and one-half times in tegminal length; apex more costal than sutural in position, rounded; sutural margin distad obliquely arcuate toward apex: costal veins more than twenty in number, distal ones largely bifurcate; discoidal rami nine; axillary veins six to seven in number; anal sulcus reaching sutural margin at one-third of its length from base. Wing with intercalated triangle relatively narrow but evident; costal veins, including mediastine vein, twenty-three

¹From *ποδῶκης*, swift-footed.

²The exact environment in which the type was taken is well illustrated by Shreve in plate 6 of his work on the physiological plant geography of the Blue Mountains (Publ. No. 199, Carnegie Institution of Washington, 1914).

in number, distal ones largely formed by branching, non-clavate; medio-ulnar area at its widest point three times as wide as medio-ulnar area at same point, divided into numerous, regular, rectangular areolets; ulnar vein with three complete and five incomplete rami.

Abdomen with surface of proximal five tergites concave, lateral margins of that section well elevated, subparallel. Fifth tergite with distal margin truncate laterad, arching to a median, broad V-emargination, proximad of which the surface of the segment bears a median longitudinal tectate fold, the emargination exposing a thickened, elevated, transverse fold proximad on the sixth tergite; latter with distal margin broadly obtuse-angulate emarginate, with the immediate angle of the emargination roundly excavate above the pair of projecting comb-like appendages, which are so characteristic of *Ischnoptera*; caudo-laterad angles of tergite faintly acute but well rounded at apex; seventh tergite laterad largely hidden under preceding segment, distal margin very weakly angulate-emarginate, the surface mesad with a medio-longitudinal rounded fold, laterad of which lie the comb-like appendages attached to preceding tergite, caudo-lateral angle rounded produced with a spiraculiform opening; eighth apparent tergite with distal margin concave, slightly widened near lateral margin. Supra-anal plate somewhat asymmetrical, in general subtrapezoidal, its greatest length contained nearly twice in greatest proximal width, greatest width at distal extremity equal to half of greatest proximal width; lateral margins converging distad, dextral margin moderately concave, sinistral margin appreciably sigmoid; distal margin obtuse-angulate emarginate; dextro-caudal angle produced into a short, blunt, acute, though non-spiniform, angle, while proximad of this on the ventral surface of plate is a broad strumose thickening equal to one-half area of plate; sinistro-caudal angle as seen from dorsum less produced and more rounded than dextro-caudal angle, actual angle acute, subspiniform and bent ventro-mesad, being non-evident from dorsum, proximad of this angle ventral surface of plate bears a similar but much less extensive and less elevated strumose thickening. Subgenital plate nearly symmetrical, as seen from venter with lateral margins subparallel; distal margin obliquely subtruncate laterad, interstyler section of margin concave with an obtuse-angulate tendency; distal portion of plate impressed; styles almost equal and symmetrical in development, symmetrical in insertion, in size sinistral slightly the larger, relatively robust, tapering distad, in profile slightly decurved with dorsal surface convex and thickly covered with adpressed spiniform teeth. Cerci elongate fusiform, depressed dorsad.

Cephalic femora with ventro-cephalic margin having three to four spines in proximal group, distal group numbering three; ventro-caudal margin with three to four spaced spines. Caudal metatarsus slightly longer than remaining joints of that tarsus combined.

General color of exposed dorsal surface burnt sienna, paling distad on sutural section of tegmina and in apical region of same to ochraceous-buff with veins pencilled with burnt sienna. Head very dark chestnut-brown, clypeus and proximal palpal joints cinnamon-buff, ultimate and penultimate joint of palpi washed with prout's brown; eyes cinnamon-brown; antennæ washed with prout's brown, paler distad on two proximal joints. Pronotum with indefinite clouds of mummy brown broadly along caudal margin, less definitely on diverging impressed sulci and in vicinity of cephalic margin. Mesonotum, metanotum and dorsal base of abdomen buckthorn brown, passing on abdomen distad though dresden brown to light mummy brown,

supra-anal plate with touches of ferruginous. Cerci mummy brown proximad, passing to brussels brown distad. Limbs, coxæ and pleura pale ochraceous-tawny, the pleura and basal portion of coxæ washed with prout's brown, which also weakly lines the extensor surface of the femora, distad the tarsi become washed with tawny. Venter of abdomen chestnut-brown, distal margin of subgenital plate edged with dull zinc orange.

Length of body, 13.5 mm.; length of pronotum, 3.1; greatest width of pronotum, 4.1; length of tegmen, 16.5; greatest width of tegmina, 4.8.

The type of this most interesting species is unique. Its sharply defined characteristics remove it from relationship with any species previously known from the West Indies, and its affinity, whether within the group or as the sole representative of another at present unrecognized assemblage, is clearly nearer the species now placed in the *Apolinari* Group. Those species are known only from the Peruvian and Colombian Andes. Whether all these forms are representatives of a very ancient fauna of wide distribution remains to be determined.

The only known specimen¹ of this species was taken in company with the type series of *Cariblatta nebulicola*, in dead leaf litter along the trail side in the mountain forest at Morces Gap. It is probably a species peculiar to the higher forest region.

NELIPOPHYGUS,¹ new genus

This is a pseudomopid showing strong blattinid tendencies, particularly in the strongly developed chitinization, the specialization of the metanotum and the vaulted type of pronotum. Our chief reasons for placing it in the Pseudomopinæ are the character of the spine development and the structure of the genitalia. Particularly noticeable features of the genus are the relatively very great length of the tarsi compared with the tibiæ, and the absence of arolia between the tarsal claws.

Compared with the genera of the Pseudomopinæ lacking arolia, and to which *Nelipophygus* may bear relationship, we find the present genus obviously differs from *Paratemnopteryx* Saussure in the male sex having abbreviate tegmina and rudimentary wings, in the specialized metanotum, and in having an asymmetrical subgenital plate and distinct styles; from *Paraloboptera* in having attingent, not lateral, tegmina in both sexes, in the presence of rudimentary wings, in the specialized metanotum, in the lack of great specialization of the distal abdominal tergite and the character of the cephalic femoral armament.

We consider the genus an aberrant member of the Group Ischnopteræ. It is very distinct in appearance and character from other pseudomopids,

¹From *νηλίκος*, bare footed, and *φύγας*, fugitive, in allusion to the lack of arolia and also its secretive habits.

resembling superficially species of *Pelmotosilpha* more than anything else. The specialization of the metanotum would suggest the African genus *Pseudoderopeltis* belonging to the same subfamily as *Pelmotosilpha*. At this writing it seems best to regard this genus as a highly and independently developed member of that section of the genera group *Ischnopteræ* made up of forms having the ventro-cephalic margin of the cephalic femora biserially spinulose.

GENERIC DESCRIPTION.—Form elliptical. Head broad, pyriform in outline, subdeplanate. Eyes lateral, widely separated, short, not prominent. Ocellar spots small. Palpi with third and fifth joints subequal in length, fourth slightly shorter. Pronotum semi-ovate in outline, greatest width caudad, in section vaulted, surface without impressions. Tegmina subcorneous, abbreviate, narrowly overlapping mesad, distad obliquely arcuate-truncate; venation indicated but not pronounced: marginal field broad; anal field large, clearly evident, but anal vein not impressed. Wings vestigial, lateral articulate pads complete covered by tegmina. Metanotum with margin specialized in both sexes. Abdomen with dorsal surface unspecialized except in retraction of seventh tergite and broad emargination of eighth tergite in both sexes. Male genitalia with subgenital plate asymmetrical, styliferous. Limbs robust, flattened, caudal tibiæ inflated. Cephalic femora armed ventro-cephalad with large spines proximad and mesad, followed by a series of very small numerous spines and an apical series of three elongate spines; ventro-caudal margin armed with spines. Median and caudal femora with strongly spined ventral margins. Median caudal tibiæ heavily spined. Tarsi elongate, slender, surpassing the tibiæ in length; pulvilli apical, present on four proximal joints; ventral surface of metatarsus and the two following joints biserially spinulose; arolia absent; tarsal claws unspecialized.

GENOTYPE.—*N. ramsdeni*, new species.

***Nelipophygus ramsdeni*,¹ new species**

Plates IX, Figures 8 to 13; X, Figures 1 to 3

TYPE.—Male; Rio Seco, San Carlos Estate, near Guantanamo, Oriente Province, Cuba. Elevation, 200 feet. April 24, 1914. (C. T. Ramsden; under rotten bark.) [Academy of Natural Sciences of Philadelphia, Type No. 5358.]

Size very large (for the subfamily); form elongate elliptical, attenuate caudad; surface moderately polished.

Head almost entirely covered by pronotum when seen from the dorsum; when seen from cephalic aspect broad pyriform in outline, the greatest width across eyes contained one and one-quarter times in greatest depth of head; occipital outline regularly arcuate, eyes not at all projecting beyond head outline; area between eyes slightly greater than one-half depth of head: ocellar spots small and circular, placed close to the antennal scrobes, slightly more than one-half as far apart as the eyes, slightly closer together than the internal portion of the antennal scrobes; a pair of ocelliform spots placed slightly ventrad of the most approximate point of the antennal scrobes, of slightly larger size than the ocelli and faintly more approximate; face

¹Dedicated to its collector, our friend, Dr. Charles Torre Ramsden, of Guantanamo, Cuba, as a token of appreciation of his indefatigable energy and interest in searching for and making known the zoölogical treasures of the island of Cuba.

with its lateral margins moderately arcuate convergent ventrad of eyes. Eyes not reaching ventrad of the ventral border of the antennal scrobes, in basal outline broad dorsad with an oblique arcuation cephalad, narrowed and subequal in width in ventral three-fifths, with the ventral margin rounded. Palpi relatively short, subcompressed; third joint relatively deep, faintly arcuate; fourth joint slightly shorter than third joint, moderately infundibuliform, distad oblique subtruncate; fifth joint subequal in length to the third joint, no deeper than distal portion of fourth joint, sublanceolate, the dorsal margin straight, apex narrowly rounded when seen in profile. Antennæ surpassing the body in length, proximal joint short and thick, third joint slightly longer than second joint, fourth and succeeding joints short, these very abbreviate proximad, elongating slightly distad.

Pronotum with greatest length contained about one and one-third times in greatest width: cephalic margin well arcuate, regularly passing by a broadly rounded and hardly appreciable angle into the broadly arcuate and diverging lateral margins; latero-caudal angles rounded, slightly more obtuse than a right angle; caudal margin broadly subtruncate; all margins cingulate. In transverse section the pronotum is regularly arcuate, the area adjacent to the latero-cephalic angles moderately but broadly decurved. Surface of pronotum without impressions.

Tegmina subquadrate, reaching to second tergite; greatest width of tegmen contained one and two-fifths times in greatest length of same. Costal margin of tegmina straight in proximal half, narrowly arcuate at extreme base, thence strongly and regularly arcuate to the disto-sutural angle; sutural margin almost straight; in transverse section the tegmina are decurved laterad, the costal section moderately embracing the dorso-lateral portions of the meso- and meta-thorax and base of abdomen. Marginal field of tegmina broad, taking up over one-third of tegminal width, not clearly defined from the sutural field; anal field very large proportionately, taking up over one-half the width and two-thirds of the length along the sutural margin, pyriform. Scapular and discoidal tegminal fields in general with venation moderately radiating; discoidal sectors seven in number; axillary veins seven in number. Wings reaching to the free margin of the median segment, longer than broad.

Metanotum with its entire distal margin between the tegmina developed into a broadly, transverse, distad subtruncate lamella, the margin of which is irregularly, sparsely and not at all deeply serrulate; on the median line is a distinct, acute, spiniform projection.

Abdomen not greatly specialized, the lateral margin of each tergite weakly arcuate and cingulate, the caudo-lateral angles slightly acute produced, caudal margins of proximal tergites subtruncate, passing to moderately arcuate-emarginate on fifth tergite; sixth tergite with distal margin arcuate-emarginate laterad, moderately broad arcuate mesad; seventh tergite hidden under sixth except for lateral angles; eighth tergite with distal margin arcuate-subtruncate emarginate, exposing the basal section of the supra-anal plate, caudo-lateral angles acute-angulate.

Supra-anal plate transverse, greatest length contained slightly more than twice in greatest width; median portion of distal margin strongly arcuate with a very faint, shallow and broad emargination mesad; surface of plate mesad slightly and broadly elevated, this area with scattered depressed hairs; distal margin with two series of long hairs, one on each side of the median emargination. Cerci relatively short and thick, composed of twelve segments, these heavy and subequal in proximal half, each slightly narrowed proximad, the cerci as a whole strongly tapering distad, the

segments there submoniliform, apex bluntly acute; dorsad hardly more deplanate than ventrad. Subgenital plate asymmetrical, relatively small; distal margin reading (in inverted specimen) from sinistral to dextral side is as follows: oblique subtruncate for one-third of margin, then weakly obtuse-angulate, the dextro-mesal portion of the margin then broadly arcuate to a corresponding point on the dextral side, followed by oblique truncation dextrad, in profile the plate is weakly decurved at its greatest production; dextral style inserted at apex of plate, sinistral style between it and the sinistral weak angulation, both styles short and thick, peg-like, slightly thickened distad and there with a number of short, radiating, chaetiform hairs. Genital hook of the usual style but much flattened. Internal genitalia also represented by a stout, straight, chitinous, fang-like spine dextrad.

Limbs flattened, the coxæ, femora and tibiæ stout, the tarsi very slender and elongate. Cephalic femora with ventro-cephalic margin armed with large spines proximad and mesad, these decreasing in length distad on mesal section, distal portion of margin with a contrasted row of very short and relatively uniform, closely placed spines; apical group of spines three in number, large, increasing in length distad, the terminal one very elongate; ventro-caudal margin with four large spines, mesad and distad, the apical the longer. Ventral margins of median and caudal femora each armed with six large, well-spaced spines, of which the distal one is larger than the others. Median and caudal tibiæ with heavy, weakly curved spines on both the flexor and extensor surfaces, these microscopically striate on their mesal surfaces, the spines of the caudal tibiæ appreciably increasing in length distad: dorsal and ventral surfaces of median and caudal tibiæ bare; median tibiæ weakly and caudal tibiæ strongly, expanding. Tarsi elongate, very slender, always surpassing the accompanying tibiæ in length; caudal metatarsus two-thirds as long as caudal tibia and slightly longer than remaining tarsal joints united; ventral surface of caudal metatarsus and second and third joints biseriate spinose ventrad, fourth joint¹ with lateral apical spines only; pulvilli distinct on first to fourth joints, apical; arolia absent; tarsal claws simple, slender, falciform, unspecialized.

ALLOTYPE.—Female; "El Peru," Monte Libano, near Guantanamo, Oriente Province, Cuba. April 13, 1913. (Chas. T. Ramsden.) [Academy of Natural Sciences of Philadelphia.]

Differing from the description of the male sex in the following features.

• Ocellar spots slightly smaller and more remote from one another than in male.

Tegmina faintly more transverse, greatest width contained one and three-tenths times in greatest length of same.

Eighth abdominal tergite truncate, with lateral angles moderately produced and a very faint median emargination. Supra-anal plate transverse trigonal, in general form similar to but more produced than in male; surface of plate with but faint indications of mesad elevation, few surface hairs and marginal hairs reduced in length and number. Cerci less attenuate distad. Subgenital plate simple, of medium size, scoop-shaped, lateral portions moderately ascending, ventral surface of plate well arcuate in transverse section; distal margin broadly arcuate.

Caudal tibiæ very distinctly expanding, but less markedly than in male sex.

General color of dorsal surface ranging from dark maroon to morocco red, the tegmina largely darker, as if washed with fuscous, and narrowly and indefinitely

¹Type has but four joints present in only remaining entire caudal tarsus; of other limbs present, normal.

washed with auburn on margins. Pronotum unmarked. Abdomen with segments distinctly but not solidly bordered distad with fuscous. Cerci argus brown proximad, passing to raw sienna distad, ventral surface occasionally with segments banded with auburn proximad. Ventral coloration between morocco red and chestnut, the coxæ and trochanters more sanford's brown to orange-rufous. Head with clypeus, labrum, palpi and labium light orange-yellow to deep chrome; antennæ mikado orange proximad, briefly passing to apricot yellow; eyes fuscous; ocellar spots yellowish white; accessory facial spots mummy brown; area between antennal bases occasionally (allotype) suffused with mummy brown. Caudal tibix and tarsi passing to claret brown or very dark claret brown; spines darkened at tips. Flexor surfaces of femora citron yellow to mustard yellow.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen ¹
♂, Rio Seco, Cuba, type.....	19.5	6.6	8.5	7.5
♀, Monte Libano, Cuba, allotype..	18	5.8	7.4	6
♀, Guantanamo, Cuba, paratype..	19	6.5	8.2	6.8

	Greatest Width of Tegmen	Length of Caudal Tibia	Length of Caudal Tarsus
♂, Rio Seco, Cuba, type.....	5.3	6.7	7.8 mm.
♀, Monte Libano, Cuba, allotype.....	4.6	6.5	7.7
♀, Guantanamo, Cuba, paratype.....	5.3	7	8.3

In addition to the type and allotype of this species we have before us an adult female from Guantanamo, Oriente Province, Cuba, collected by Mr. Ramsden, without date, and two immature females, one in the instar preceding maturity and the other much younger, taken with the type. Of these the adult female can be considered paratypic.²

We have no comments to add to the description of this most peculiar and interesting genus and species, except that the elongation of the tarsi is not at all as pronounced in the immature specimen in the instar preceding maturity, as in the adults.³

SYMPLOCE Hebard

This genus is distributed over the tropics, and to some extent the subtropics, of both hemispheres, the number of species at present known actually referable to the genus being uncertain, as many

¹Taken along sutural margin.

²This specimen has one of the caudal tarsi but four jointed, the other of the normal five jointed type.

³This specimen has four joints only present in one cephalic tarsus and one median tarsus. The very immature specimen has five joints in all remaining tarsi.

yet figure in the literature as species of *Ischnoptera*. As these species are studied in the light of present day knowledge of the group, we will secure a clearer conception of the distribution and development of the genus. As far as definitely known at this time the genus occurs in tropical America solely in the West Indies, the Florida Keys, Mexico and Lower California, while it is also found in southern and eastern Africa and the Hawaiian Islands. The species are all pale ochraceous and very much alike in general appearance. The male genital features, however, are very distinctive and of the greatest value in separating the species.

Hebard¹ has published a critical paper upon the American species of the genus, in which will be found full descriptions and detailed figures of most of the forms, which the student must consult in examining material of this genus. As the male differential characters are very difficult to express in words, we have made no effort to construct a key, as an examination of the figures referred to will be of far more service than any word analyses. Two new species of the genus are here described.

***Symploce hospes* (Perkins)**

Phyllodromia hospes PERKINS, 1899, 'Fauna Hawaiiensis,' II, p. 5. Kauai and Honolulu, [Hawaiian Islands].

A specimen of this widely distributed species, in the collection of the United States National Museum, was taken, in 1917, from *Anona* (presumably the fruit) received at Washington, in quarantine, supposedly from Antigua. This is the first record of the species from the West Indies, properly speaking, although the type of the synonymous *Symploce lita* came from Key West, Florida. The species also occurs in eastern Mexico (Vera Cruz), Lower California (San José del Cabo) and in the Hawaiian Islands. Hebard has recently discussed the nomenclature of the species,² correctly assigning Perkins' name to this insect, although the latter's original description is of little value in a group as intricate and difficult to study as the Pseudomopinae. Hebard's descriptions of the synonymous *Symploce lita*³ are very full and by far the most important information we have on the characters of the species.

The specimen here reported is of very similar proportions to the male from Vera Cruz, Mexico, recorded by Hebard, and its dimensions are: length of body, 11.6 mm.; length of pronotum, 3.3; greatest width of pronotum, 3.9; length of tegmen, 11; greatest width of tegmen, 3.6; length of caudal tibia, 4.5.

¹1916, Trans. Amer. Entom. Soc., XLII, pp. 357-370, Pls. xvii-xviii.

²1922, Occas. Papers Bernice Pauahi Bishop Mus., VII, pp. 330-331.

³1916, Trans. Amer. Entom. Soc., XLII, pp. 357-359, Pl. xvii, fig. 8, Pl. xviii, figs. 1-4; 1917, Mem. Amer. Entom. Soc., No. 2, pp. 151-153, Pl. II, figs. 16-20.

Symploce jamaicana (Rehn)

Ischnoptera jamaicana REHN, 1903, Trans. Amer. Entom. Soc., XXIX, p. 264. ♂, ♀; Jamaica; [Port Antonio], Portland [Parish], Jamaica.

JAMAICA.—Kingston, VII, 4, 1920, (R. and H; very common at night in short dry grass in roadside gutter), 9♂, 33♀, 3 immat. indiv., [Heb. Cln. and A. N. S.P.]. Beach at south end of Long Mountain, St. Andrew Parish, five miles east of Kingston, VIII, 5, 1923, (Rehn; under beach trash in stony wash of Hope River), 6 immat. ♀, [A. N. S. P.].

PORTO RICO.—Ensenada, Department of Aguadilla, VI, 14–19, 1915, (Lutz; on side hill), 1 ♀.

The species has been recorded by Hebard,¹ in his study of the genus, from Gregory Park, St. Andrew Parish, and Montego Bay, Jamaica, and Little Cayman Island. The present Porto Rican record, the first from that island, is probably that of an accidental commercial importation.

On the outskirts of Kingston we found this species at night very common in a roadside gutter, often a number clustered together, not particularly active and very rarely flying.

The immature individuals from near the south end of Long Mountain represent two instars.

Hebard has already analyzed the characters of the species. The great difficulty in determining females of this genus, and particularly of the West Indian *Capitata* Group of species, has caused us to make a careful search for ambisexual features which would supplement the very marked diagnostic features found in the male sex. We have found some features in the maxillary palpi, which to a certain degree furnish assistance, at least in grouping species. The palpi are occasionally much thinner and more compressed and also deeper, in some individuals than in others, and this, to at least a degree, appears to be due to drying or shrivelling. This possibility furnishes an element of uncertainty in using the form of the profile and dorsal outline of the palpi for comparison, but, in the *Capitata* Group at least, the relative proportions of the fourth and fifth joints seem to remain fixed within given species. The species *jamaicana*, *cristata* and *morsei* have these segments subequal in length, in *bilabiata* and *flagellata* the fifth is faintly the longer, and in *bicolor* and *capitata* the fifth is appreciably longer than the fourth. This feature is of but relative value as a determinative aid, but it will serve to eliminate certain species from consideration and thus assist in naming material.

¹1916, Trans. Amer. Entom. Soc., XLII, p. 359.

Symploce cristata, new species

Plate X, Figures 4 to 5

This species shows distinct relationship to *S. morsei* Hebard. From that insect the male before us differs in the very slightly narrower interocular space and distinctive specialization of the dorsal surface of the abdomen. The supra-anal plate is similar (with none of the asymmetry developed in *S. bilabiata* here described), though showing a slightly greater tendency toward bilobation, while the specialization of the subgenital plate differs only in the disto-sinistral angulation of the distal scute and the heavier adjacent sinistral process.

Like *morsei*, the present species is less reddish than *S. capitata* (Saussure) and *bilabiata*.

TYPE.—Male; Port-au-Prince, Haiti, Hispaniola. [Hebard Collection, Type No. 864.]

DESCRIPTION OF TYPE.—Size large for the genus; form moderately robust.

Interocular space slightly narrower than occipital depth of eye and three-quarters as wide as that between the ocellar areas. Ocelli small, with surfaces of ocellar areas slanting to and rounding evenly into the interocellar area. Maxillary palpi with fourth and fifth joints subequal in length.

Pronotum of form usual in genus, moderately transverse, subtrapezoidal in outline, greatest length contained about one and one-third times in greatest width of same, which is at caudal third of length.

Tegmina surpassing apex of abdomen by slightly less than length of pronotum, largely subequal in width, greatest width contained about three times in greatest length of same. In general form tegmina are as described for *S. bilabiata*; costal veins less longitudinal and more oblique than in latter species.

Median segment specialized much as in *capitata* and *morsei*; with convergent ridges meso-proximad, caudad of which is an extensive concave area, furnished cephalad with numerous elongate scattered hairs radiating cephalad and laterad. Succeeding tergites to seventh, as in *capitata*, with latero-caudal angles briefly acute-angulate produced except those of seventh; eighth tergite very strongly concave, its lateral portions produced, forming cupped angulate portions between which the caudal margin is strongly concave; ninth tergite rather narrowly visible but bearing a stout knob mesad, which is furnished on each side with an erect crest of agglutinated hairs, all of the same length and curled slightly outward.

Supra-anal plate with surface ascending (but showing weak though extensive concavity on each side) to a distinct, rounded, proximal, transverse ridge, in this region supplied laterad with numerous, short hairs; free margins straight and weakly oblique produced, then suddenly produced in meso-distal half with margins convex, so that at their juncture a nearly rectangulate emargination occurs, the produced portion of the plate in consequence being almost bilobate and nearly twice as wide as long. Subgenital plate with dextral free margin oblique and broadly convex from base of cercus to median point, there the plate is produced in a moderately large but delicate and moderately inset scute, which is rounded to its sinistro-distal portion, a rectangular point there occurring; beyond this a projection extends an equal distance

caudad, fused in most of its length with the scute but homologous to the flagellate process developed in *morsei*; the sinistral portion of the free margin of the subgenital plate is weakly oblique and nearly straight to the base of this process.

Limbs and armament of same as characteristic of the genus.

ALLOTYPE.—Female; La Serre, Haiti, Hispaniola. Elevation about 125 feet. March 3, 1922. (F. E. Watson.) [American Museum of Natural History.]

DESCRIPTION OF ALLOTYPE.—Differing from the description of the type in the following noteworthy features.

Occipital interocular space slightly greater than occipital depth of eye, subequal to that between ocellar areas.

Dorsum of abdomen unspecialized. Supra-anal plate in general form essentially as in *S. bilabiata* except that distal emargination is smaller and more delicate in character. Subgenital plate essentially as in *S. bilabiata*.

Head, underparts and limbs light ochraceous-buff. Head occasionally (type only) with a suffusion of prout's brown in the interocellar area. Five abdominal sternites each with a dot or small suffusion of blackish brown on each side, occasionally with both, coxæ flecked with the same color. Spines of limbs ochraceous-tawny. Pronotum ochraceous-buff, disk weakly tinged with tawny. Tegmina translucent, weak ochraceous-buff. Dorsal surface of abdomen buff proximad and narrowly laterad, remaining portions suffused with prout's brown, becoming blackish toward the clearly defined pale lateral margins on the more distal of the broad tergites. Supra-anal plate of female bimaculate with prout's brown. Cerci dresden brown.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Port-au-Prince, type	13.4	3.5	4.5	13	4.4 mm.
♂, Maneville, paratype.	10	2.4	3.5	10.3	2.9
♀, La Serre, allotype...	12.3	3	3.9	12	3.8
♀, Sources Puantes, paratype.....	10.3	2.7	3.8	11.2	3.6

In addition to the type and allotype we have before us the following series, all the adults of which we consider paratypes: Sources Puantes, twenty kilometers north of Port-au-Prince, Haiti, III, 26, 1922, (F. E. Watson), 1 ♀; La Serre, Haiti, elevation about 125 feet, III, 3, 1922, (F. E. Watson), 3 ♂, 2 ♀, 1 immature ♀; Pont Beudet, Haiti, elevation about 100 feet, III, 3-4, 1922, (F. E. Watson), 1 ♀; Maneville, Haiti, elevation about 60 feet, II, 6-10, 1922, (F. E. Watson), 1 ♂.

All of these specimens are from the collection of The American Museum of Natural History.

An examination of the whole series shows that in all but two females, one from Sources Puantes and the other from Pont Beudet, five tarsal joints are present on all complete tarsi, while the first mentioned of the

two exceptions has four joints only in one caudal tarsus, and the second mentioned has one tarsus of each pair of limbs with but four joints.

Symploce capitata (Saussure)

Bl [atta] capitata SAUSSURE, 1862, Rev. et Mag. de Zool., (2) XIV, p. 167. ♂; Cuba.

The nomenclatural vicissitudes of this species, and the characters and variation of it, have been discussed by Hebard.¹ He recorded it from the following localities in Cuba: Viñales, Pinar del Rio Province; Cabañas, Pinar del Rio Province; Havana; Cabana, Havana; San Antonio, Havana Province; Cienfuegos, Santa Clara Province; Cayamas, Oriente Province and San Carlos Estate, Guantanamo, Oriente; also from the Isle of Pines. Caudell² has recorded this species from Antigua, on the basis of female material. We have one of his specimens before us, and the shape of the eyes and interocular space shows it does not represent *capitata*, but instead is nearer *bilabiata*, under which it is discussed.

We have nothing to add to Hebard's treatment, except to call attention to the fact that the fourth and fifth palpal joints show a considerable difference in length, the former being distinctly shorter than the latter, in this resembling *bicolor*, which, however, is otherwise a very different species.

Symploce morsei Hebard

Symploce morsei HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, p. 365, Pl. XVIII, figs. 11-13, ♂, ♀; Nassau, New Providence Island (type locality), Bahamas; Mangrove Cay, Andros Island, Bahamas; Eleuthera Island, Bahamas.

BAHAMAS.—Nassau, New Providence Island, V-VI, 1917, (W. M. Mann), 1 ♀. Andros Island, V-VI, 1904, (W. M. Wheeler), 1 ♀. Fish Hawk Key, Andros Island, V, 19, 1904, (W. M. Wheeler), 1 ♀. Mangrove Key, Andros Island, V, 25, 1904, (W. M. Wheeler), 1 ♂.³ 1 ♀; V-VI, 1917, (W. M. Wheeler), 1 ♀.

HISPANIOLA.—Port-au-Prince, Haiti, 1 ♂, 1 ♀, [Paris Museum].

The localities given here in the text and reference comprise all known for the species, which was thought to be restricted to the Bahaman group. It is possible, however, that the Port-au-Prince individual here reported may have been an adventive one, although future work alone can determine this point.

This species has the fourth and fifth palpal joints subequal in length, as in *jamaicana*, *bilabiata* and *cristata*.

¹1916, Trans. Amer. Ent. Soc., XLII, pp. 361 to 365.

²1922, Univ. of Iowa Studies in Nat. Hist., X, No. 1, p. 21.

³Recorded by Rehn, in 1906, as *Ischnoptera blattoides*, which is now known to be exclusively an Old World species, but at that time considered virtually circumtropical.

Symploce bilabiata,¹ new species

Plate X, Figures 6 to 9

A very distinct species in the male sex, probably as nearly related to *S. capitata* (Saussure), from Cuba, as to the other forms of the *Capitata* Group, but showing most resemblance to *S. flagellata* and *S. morsei* Hebard. The chief differential features are in the male genitalia, in the supra-anal plate being markedly bifid distad, this condition also somewhat asymmetrical, in the disto-ventral section of the subgenital plate of the same sex having an area of tooth-like spines, and in the shape of the dextral style, which is broad, short and flattened, with a rounded node dextrad.

The females are extremely hard to distinguish from those of *morsei* and *flagellata*. The longer fifth palpal joint of *bilabiata* will distinguish it from *morsei*, while from *flagellata* the narrower and more elongate marginal field of the tegmina, the more longitudinal and less obliquely divergent tegminal costal veins, as well as the wider medio-discal area of the wing, when compared with the medio-ulnar area, will be found useful. The degree of divergence of the tegminal costal veins from the discoidal vein is subtle, but a feature of considerable value, while the width of the wing areas is also of assistance in separating the species.

TYPE.—Male; Culebra Island, West Indies. March 4, 1906. (W. M. Wheeler.) [American Museum of Natural History.]

Size medium; form elongate elliptical, subdepressed; surface moderately shining.

Head narrowly visible cephalad of pronotal disk; occipital and eye outline regularly but not strongly arcuate; interspace between eyes slightly greater than the depth of eye at occiput; general outline of head trigonal-pyriform, the greatest width across eye slightly less than greatest length of head, outline of eyes regularly arcuate; face moderately deplanate. Palpi with third joint moderately stout, slightly arcuate proximad when seen in profile; fourth joint about three-quarters as long as third joint, moderately infundibuliform; fifth joint slightly longer than fourth joint, in profile moderately deep proximad, narrowing distad, dorsal line straight. Eyes not at all prominent, in basal outline subreniform, regularly narrowing ventrad, broad dorsad. Antennae slightly surpassing the body in length; proximal joint short, slightly inflated.

Pronotum moderately transverse, of the form usual in the genus, greatest length contained one and one-third times in greatest width, greatest width situated distinctly caudad of the middle; cephalic margin truncate mesad, rounding into the lateral margins, which are oblique, arcuate-truncate, caudad diverging to the rounded obtuse-angulate lateral angles, thence briefly converging subtruncate to the weakly produced

¹This is the species recorded by Rehn (1910, Bull. Amer. Mus. Nat. Hist., XXVIII, p. 73) from Culebra Island, as *Ischnoptera rufescens*. This latter specific name is now known to be a synonym of *Ischnoptera rufa* rufa.

and very broadly obtuse-angulate caudal margin; all margins cingulate; surface of pronotum without impressions; subequal lateral portions in section strongly deflexed, narrowly rounding into the transverse weakly arcuate disk.

Tegmina surpassing the apex of the abdomen by approximately the length of pronotum, lanceolate, in greater part nearly subequal in width, the greatest width, which is at distal fourth, contained three and one-fifth times in greatest length; costal margin moderately arcuate proximad, nearly straight for the greater portion distad, briefly rounding to the rounded obtuse-angulate apex, which is nearer the costal margin; sutural margin in greater part nearly straight, in distal fourth obliquely arcuate to the apex. Marginal field relatively narrow, elongate, occupying one-third of tegminal length; scapular field moderately broad; anal field moderately elongate, subpyriform, in length equal to two-fifths of tegminal length, apex blunted. Costal veins numerous, proximad diverging from the discoidal vein at a very acute angle and in general in that section more longitudinal than oblique; discoidal sectors longitudinal, eight in number (including ulnar vein); axillary veins seven in number. Wings equalling the closed tegmina in length, moderately broad; apex of wing rounded obtuse-angulate; intercalated triangle of medium size, elongate trigonal, its axis slightly longer than one-fifth of wing length along anal vein; costal veins sixteen in number, a number of the distal ones being forks of a common ramus, of the proximal ones derived from the mediastine vein, oblique, very faintly thickened; discoidal vein furcate slightly distad of middle of wing; medio-discoidal area broad, one and one-half times as broad as medio-ulnar area, with transverse veinlets regular and with areolets large, few and subquadrate; ulnar vein with one¹ to two complete and two incomplete rami; axillary vein triramose, the proximal one well removed from the other two, which are closely grouped.

Abdomen with median segment specialized in having a central group of adpressed agglutinated hairs directed caudad, covering a low "boss," laterad of which are basin-like depressions; succeeding tergites to fifth moderately rectangulate produced caudo-laterad; sixth tergite rounded rectangulate caudo-laterad, broadly arcuate-emarginate mesad; its surface with a similarly arcuate and deep transverse sulcate impression; seventh and eighth tergites very narrow, the seventh with a group of sparse, erect hairs. Supra-anal plate transverse, depressed, asymmetrically produced mesad into a pair of rounded, decurved lobes, the dextral as broad as long and narrowing distad, the sinistral more slender. Cerci subfusiform, strongly tapering distad, mesad and distad the articles being moniliform and narrowed at their bases, composed of twelve segments, dorsal surface of cerci subdeplanate, each segment ventrad inflated and with a group of chaetiform and unmodified hairs. Subgenital plate rather small, slightly asymmetrical; margin beginning on dextral side, first with a moderately rounded rectangulate angle or shoulder which fits about the cercal base, then a broad and shallow arcuate emargination, this terminating at a low, circular node, which is the dextral style, and immediately dextrad of which the margin is developed as an irregularly subtrigonal lamella of chitin, reflexed caudad; sinistral style erect, spiniform, acute, slightly sinuato-falcate distad, sinistral portion of margin arcuate-emarginate, not fitting around the cercal base; ventral surface of subgenital plate bearing distad, in the region of the styles, a mat of adpressed, dorso-caudad directed, spinules.

Limbs and armament of same as characteristic of the genus.

¹In this case it is furcate very shortly after its divergence from the ulnar vein.

ALLOTYPE.—Female; same data as type, except date of capture is March 6, 1906. [American Museum of Natural History.]

Differing from the above description of the type in the following features.

Head hardly visible cephalad of pronotal disk; interspace between eyes subequal to the depth of eye at occiput.

Pronotum slightly more decidedly transverse, greatest length contained one and two-fifth times in greatest width.

Tegmina with greatest width contained three times in greatest length of same.

Abdomen with median segment unspecialized; seventh and eighth tergites without median specialization of marginal form or structure. Supra-anal plate transverse trigonal, the greatest median length contained nearly twice in greatest width, the lateral portions of margin of plate faintly arcuate-emarginate, the apex rounded, briefly emarginato-fissate, the whole margin with a series of chaetiform hairs, directed dorso-caudad, most numerous about apex; surface of plate excavate proximo-laterad. Subgenital plate large, transverse, the margin sinuato-arcuate, cercal emargination distinct but shallow, distal margin with a faint emarginate tendency.

General color above (with closed tegmina) ochraceous-buff, passing in certain females into weak ochraceous-orange; below light ochraceous-buff to ochraceous-buff. Head unmarked; eyes piceous to weakly mottled with mummy brown; antennæ usually of general dorsal color; palpi usually with fourth and fifth joints tipped with mummy brown. Pronotum with the deflexed lateral portions warm buff to ochraceous-buff, contrasted with disk. Tegmina with marginal field colored similarly to the lateral portions of the pronotum. Wings clear hyaline to weakly infumate; veins largely pencilled with snuff brown to bister, the ulnar, axillary and radiate veins of the deeper tone; region of the costal veins narrowly pale ochraceous subopaque, submarginally appreciably infumate with bister for a distance. Abdomen with dorsal surface largely pale ochraceous-buff to ochraceous-buff, large intermarginal sections, becoming deeper in tone distad and usually uniting on the distal second to third tergites, mummy brown to fuscous, the lateral pale margins of the abdomen relatively broad and subequal, the narrow distal segmental pale margins occasionally obsolete; supra-anal plate pale, occasionally with paired lateral dark spots. Cerci of the dorsal abdominal color dorsad, ventral surface completely or in large part fuscous. Coxal spots and lateral series of dots on ventral abdominal surface fuscous; subgenital plate with a medio-longitudinal blotch of pitch brown. Limbs of the dorsal coloration.

The San Juan female and one of the same sex probably from Culebra Island exhibit a most striking phase of coloration, having all the tibiae and the greater portion of the caudal tarsi deep piceous, as well as the antennæ exclusive of the proximal joint, most or all of the fourth and fifth palpal joints and all of the cerci except a pale medio-dorsal line. The subgenital plate also has the median blotch larger and solidly colored. This coloration causes a strong superficial resemblance to *Pseudosymptloce elongata*, to which the present species is in no way closely related. Additional information relative to the actual distribution and environment frequented by this color phase may show some definite correlations.

The type, allotype, and the other specimens presumably from Culebra Island have been dried from alcohol, but the coloration seems not to have been seriously affected.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Culebra Island, type	10.6	2.9	3.9	10.6	3.3 mm.
♂, Probably Culebra Island[2].....	10.7 (10.5-11)	3.1 (3-3.2)	4 (4-4.1)	10.3 (10.2-10.5)	3.6
♀, Culebra Island, allo- type.....	10.2	3.4	4.7	11.9	4
♀, Culebra Island, paratype.....	10.7	3.4	4.6	damaged	
♀, San Juan, Porto Rico	13	3.6	5.2	13	4.1

In addition to the type and allotype we have before us a paratypic female from Culebra Island, taken March 5, 1906, by the same collector and in the same series; two males and one female probably from Culebra, but with no data except "1" and "3," in The American Museum of Natural History¹; a female from Aguas Claras, Porto Rico,² January 19, 1914, in the Hebard Collection; and a female from Dorado, Department of San Juan, Porto Rico, February 11-14, 1914 (Lutz; sifting in sea-grape thicket on sandy soil), in the American Museum collection. We have also seen an immature specimen from Culebra Island, March 1906, (W. M. Wheeler), from the American Museum series.

It would appear as if *S. bilabiata* occurred over at least a portion of Porto Rico, Culebra Island and probably the others of the Virgin Island group.³

The series of the present species shows that the absence of one of the usual five tarsal joints is a frequent feature. All of the males seen have five joints in all the tarsi preserved. But one of the females has five joints in all the undamaged tarsi, while the others have one or more tarsi with but four joints; in three the cephalic tarsi show four in one and five in the other; two have both caudal tarsi four-jointed, yet a third has them five-jointed. The number of discoidal sectors varies from seven to nine, while the complete ulnar rami number three in the Dorado female.

¹Dr. F. E. Lutz is unable to shed any light on the exact locality from which these specimens were obtained.

²Recorded by Hebard (1916, Trans. Amer. Entom. Soc., XLII, p. 369) as *S. flagellata*.

³The female from St. John, Virgin Islands, recorded by Hebard (1916, Trans. Amer. Entom. Soc., XLII, p. 369) as *flagellata*, is probably *bilabiata*, but the individual is now not accessible for examination.

The emargination of the supra-anal plate of the female varies in its width and fissate character, being nearly V-emarginate in certain individuals. Differences in compression and stress of the plate while drying may be influencing factors in this variation.

Caudell¹ has recorded as *S. capitata* two females from Antigua, one of which is before us. The species represented is not *capitata*, as the shape of the marginal field of the tegmina, of the eyes and width of interocular space show. As females of this genus are extremely difficult to determine without accompanying males, we would not hazard a positive determination of the Antigua female, except to say that it is nearest to *bilabiata*, although probably representing a distinct and undescribed species, the male sex of which must be known before its correct position can be ascertained.

Symploce flagellata Hebard

Plate X, Figure 10

Symploce flagellata HEBARD, 1916, Trans. Amer. Entom. Soc., XLII, p. 367, Pl. XVIII, figs. 14 to 17. ♂, ♀; Saona Island, Hispaniola; Desecheo Island, Porto Rico (type locality); Mona Island, Porto Rico; Aguas Claras, Porto Rico (= *S. bilabiata*); St. John, Virgin Islands (probably = *S. bilabiata*).

HISPANIOLA.—Haiti, 1 ♀, [M. C. Z.].

A re-examination of all the original material of this species now accessible, as well as the above specimen, shows that in all probability the present species does not occur on the island of Porto Rico itself or in the Virgin Islands. The difficulty encountered in correctly working out the distribution of this species and the preceding new one—*S. bilabiata*—is that females are quite hard to distinguish. The characters which we have used to separate individuals of that sex we have discussed in the diagnosis of *S. bilabiata*, while we have already commented upon the distribution of that species.

Of the originally included specimens, the Saona Island female is *flagellata*, as is true of all the Desecheo and Mona Islands adults. The Aguas Claras females are probably both *bilabiata*—the one now in hand is clearly that species. The St. John, Virgin Islands female originally reported, is not in hand at present, but in all probability is *bilabiata*, the species found on Culebra Island.

¹1922, Univ. of Iowa Studies in Nat. Hist., X, No. 1, p. 21.

Symploce bicolor (Beauvois)

Blatta bicolor BEAUVOIS, 1805, 'Ins. Rec. Afr. Amér.,' p. 183, Pl. Orth. I B, fig. 6. Santo Domingo.

HISPANIOLA—Gonave Island, Haiti, VII, 12, 1922, (O. W. Barrett), 1 ♀, [Hebard Cln.]. Blanton Mine, north of San Cristobal, Province of Santo Domingo, Dominican Republic, VII, 26, 1917, (H. Morrison), 1 ♀, [U. S. N. M.].

Hebard¹ has analyzed the characters of this peculiar species and at this writing the sole additional information regarding it we possess is the material here recorded. The exact localities previously recorded by Hebard are; Azua, Province of Azua, and San Francisco Mountains, thirteen kilometers north of San Cristobal,² Province of Santo Domingo, Dominican Republic, Hispaniola.

NESOMYLACRIS,³ new genus

This group of two species occupies a position related on one hand to the genus *Symploce* and on the other, very probably, to the African genus *Temnopteryx*. The latter genus has been recorded from the Americas numerous times, but in practice it has been such a dumping ground for all types of pseudomopids which happened to possess truncate or subtruncate tegmina, that, in general, a generic assignment there meant relatively nothing, unless qualified by comparison with other, clearly defined species, from which one could get a truer idea of real affinity. The genotype of *Temnopteryx* is the South African *phalerata* Saussure, and at this writing that species is represented before us by several females, so that it is possible for us to get, for the first time in our studies, a clear idea of its characters. We are now able to state definitely that we have seen no species from the American continent which can be generically referred to the genus *Temnopteryx*.⁴

In the reduced and truncate or sublobiform tegmina, the two species which are here placed in a new genus show a general and superficial resemblance to that host of species of a variety of real affinities which have

¹1916, Trans. Amer. Entom. Soc., XLII, pp. 369-370.

²See p. 11, footnote 1.

³From νῆσις, an islet, and μύλακρῖς, cockroach.

⁴An analysis of the available material and descriptions of the species from the mainland of America and its adjacent islands, which have been referred to the genus *Temnopteryx*, and not since shown to belong to other genera, demonstrates that with the following exceptions all are known or are stated to have spination of "Type B" on the ventro-cephalic margin of the cephalic femora. The exceptions are *guatemalæ* and *snodgrassi*, which are said to have the distal half of the margin unarmed; nothing is stated concerning the armament in *lobipennis*, *dimorpha* or *castanea*, and *brevipennis* is said to have "Type A."

As "Type A" is that found in the genotype of *Temnopteryx*, it seems evident that those said or known to have "Type B," and those with the margin unarmed distad, will be found to belong to other genera. This appears to be true of *brevipennis* as well, but in that case is due to the presence of other features which we need not discuss here.

been unceremoniously dumped in the genus *Temnopteryx*. A great number of these "species" have been or are being demonstrated to be the female sexes of very different looking males which belong to a number of genera, while others, of which brachypterous males are also known, represent genera which show differences in spination, abdominal specialization, tarsal and palpal structure which have been overlooked or ignored.

When compared with the genus *Symploce* (as represented by its genotype *S. capitata*), the present genus can be distinguished by having the tegmina reduced in size in both sexes, virtual absence of venation of same, interocular space broader than interocellar space in both sexes, and the lack of evident specialization of the distal abdominal tergites in the male. From *Temnopteryx* (as represented by its genotype *T. phalerata*), *Nesomyiacris* can readily be distinguished by the elongate, narrow, non-deplanate head, less distinctly veined tegmina (which in *Temnopteryx* show a clearly defined and normally shaped and sized anal field), articulate though reduced and functionless wings, and very elongate, slender and hardly compressed tarsi (as compared with robust, relatively short and strongly compressed tarsi in *Temnopteryx*).

It appears to us that *Nesomyiacris* represents a specialized offshoot of the symplocoid stock, much as *Nelipophygus* does of the ischnopteroid phylum.

GENERIC CHARACTERS.—Head pyriform, hardly depressed; interocular space broad, broader than that between ocellar spots. Pronotum arcuate in transverse section, lateral portions decidedly declivent. Tegmina abbreviate, quadrate or subtrigonal, corneous; venation poorly indicated. Wings greatly reduced, lateral, lobiform, but articulate. Abdominal segments unspecialized except for genital plates. Subgenital plate of male asymmetrical. Cephalic femora with ventro-cephalic margin armed with regular uniseriate spines ("Type A"), distal group on same margin made up of two larger spines. Tarsi proportionately slender and elongate; caudal tarsi subcylindrical, metatarsus as long as or longer than remaining tarsal joints, ventral surface of metatarsus biseriate spinulose; tarsal joints provided with apical pulvilli. Arolia present. Tarsal claws equal, margins simple.

GENOTYPE.—*N. relica*, new species.

KEY TO SPECIES

- Tegmina attingent, subtrigonal in shape, covering but a portion of the lateral, lobiform wings. Cerci in large part tapering and moniliform. Sinistral style of male subgenital plate spiniform, subfalciform, surface unarmed; dextral style represented by mere knob. (Cuba.).....*cubensis*, new species.
- Tegmina attingent, quadrate, completely covering the lateral lobiform wings in both sexes. Cerci of male broader and fusiform. Sinistral style of male subgenital plate elongate, acuminate, its surface covered with recurved, shagreenous spicules; dextral style not evident. (Jamaica.).....*relica*, new species.

***Nesomylacris cubensis*, new species**

Plates X, Figures 11-13; XI, Figure 1

TYPE.—Male; twelve and one-half kilometers south of Pinar del Rio, Pinar del Rio Province, Cuba. September 12-23, 1913. (Lutz; in dry region of pines and palmettos.) [American Museum of Natural History.]

Size small; form elliptical, tegmina abbreviate, wings lobiform, exposed; surfaces polished, less decidedly so on dorsum of abdomen.

Head very narrowly visible cephalad of pronotum when seen from dorsum, general form of head pyriform, regularly narrowing toward buccal region, occipital and ocular outline regularly arcuate. Interspace between eyes broad, equal to one and one-third of the occipital depth of eyes; ocellar spots elliptical, set obliquely, faintly less distant than eyes; antennal bases slightly more widely separated than eyes; face moderately deplanate in profile. Palpi with fourth joint slightly shorter than third joint, rather strongly infundibuliform, distal margin slightly oblique truncate; fifth joint slightly longer than third joint, moderately inflated, ventral margin arcuate proximad, dorsal margin faintly concave, the joint bluntly acuminate distad. Eyes not prominent, in basal outline strongly reniform, very broad toward occiput, strongly narrowing toward mouth. Antennæ with proximal joint moderately enlarged.

Pronotum in outline semi-orbicular, in dorsal view regularly arcuate, when examined in detail the cephalic margin is subtruncate, the latero-cephalic angles well rounded, caudal margin subtruncate, caudo-lateral angles rounded, all margins cingulate; surface of pronotum without impressions; in section moderately arcuate, latero-cephalic angles moderately decurved.

Tegmina chitinous, broad, subtrigonal, greatly abbreviate, the apex, which is costal, not reaching to the distal margin of the metanotum, narrowly attinent mesad, greatest width considerably greater than length; costal margin faintly arcuate, apex broadly rounded, distal margin obliquely concavo-truncate, disto-sutural angle and sutural margin regularly and continuously arcuate; venation hardly indicated, such as is apparent is tracheiform; no defined marginal or anal fields. Wings lateral, lobiform, articulate pads, reaching almost to the distal margin of the median segment, a considerable portion not covered by the tegmina.

Mesonotum and metanotum each with a very broad lappet-like chitinous projection caudad, which is continuous with the structure and character of the mesonotum, not reaching the bases of the wing pads, truncate distad, rectangulate disto-laterad; of the metanotum extending across from under the wings, the margin narrowly rounded laterad, nearly straight on the distal margin except for a faint and very broad median angulation.

Abdomen deplanate dorsad; tergites exclusive of ultimate one, cingulate laterad, disto-lateral angles moderately produced acute, exclusive of ultimate tergite, which has them broadly rounded; distal margin of proximal tergite truncate, thence these margins are gently arcuate concave to the ultimate one which is more strongly arcuate-concave. Supra-anal plate moderately transverse, the distal margin rounded bilobate, the median emargination broadly obtuse-angulate. Cerci relatively long, composed of eleven segments, tapering from the third segment, decidedly moniliform thence distad, apex attenuate but not acute. Subgenital plate asymmetrical, of medium size; margin arcuate sinistrad, greatest distal extent of plate appreciably

sinistrad of median line, dextral portion of margin broadly and obliquely arcuato-emarginate; sinistral style spiniform, subfalciform; dextral style represented by a mere knob at the distal end of the dextral emargination; distal extremity of plate with surface transversely impressed.

Limbs moderately robust, coxæ and femora markedly, tibiæ moderately, compressed. Cephalic femora with ventro-cephalic margin with a regular series of "Type A" spines, these relatively stout, decreasing in length and intervals distad from proximal fourth, apical spine with distal one appreciably the longer; ventro-caudal margin with five spaced spines, none in proximal two-fifths. Median and caudal femora with ventral margins well spined. Tarsi with well-marked apical pulvilli on the four proximal segments, metatarsi and succeeding joint biseriate spinulose ventrad; caudal metatarsus slightly longer than the succeeding joints united.¹

General coloration of head, pronotum, tegmina, meso- and metanotum and median segment mars orange, with well-defined lateral edgings of buff-yellow to mustard yellow on pronotum and tegmina, these relatively broad, narrowing cephalad, not sharply defined from the general coloration of those parts. Dorsal surface of abdomen blackish brown, the proximal tergites mesad occasionally (type) showing traces of mars orange; broad, subequal lateral bars of the same bordering color as found on the pronotum indicated on all the abdominal tergites, the penultimate one in addition with its distal margin rather broadly margined with the same, this making a transverse connecting bar of that color; distal margin of the other tergites occasionally (paratype) weakly and narrowly pencilled with buckthorn brown. Supra-anal plate and cerci of the general dorsal abdominal color, the former narrowly edged distad with yellowish, and the latter faintly pointed along their median line with buckthorn brown. General coloration of head, ventral thoracic segments, coxæ and limbs and lateral borders of abdominal sternites between ochraceous-buff and ochraceous-orange; disk of ventral surface of abdomen and subgenital plate blackish chestnut-brown; median and caudal coxæ each with a blackish chestnut-brown spot proximad, larger on the caudal pair, occasionally (paratype) this suffusing much of the adjacent coxal surface. Occiput occasionally (type) clear ochraceous-orange; eyes mottledummy brown and blackish brown, antennæ progressively suffusing with bister distad.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen ²	Greatest Width of Tegmen
♂, type.....	9.7	3.3	4.5	2.5	2.7 mm.
♂, paratype.....	8.3	3.2	4.4	2.6	2.8

In addition to the type we have before us a paratypic male, measured above, bearing the same data as the type except that it was taken by Leng. The paratype shows no noteworthy differences from the type.

¹The type has one caudal tarsus four-jointed, the others five-jointed.

²Greatest visible length along the costal margin.

Nesomylacris relicæ, new species

Plate XI, Figures 2 to 5

When compared with *N. cubensis*, the Jamaican *relicæ* can be distinguished immediately by the attingent, quadrate tegmina, which completely cover the lateral, lobiform wings, while the cerci are broader and fusiform, the ultimate tergite is straight transverse distad and the structure of the male subgenital plate and development of the styles is different.

TYPE.—Male; Stony Hill, St. Andrew Parish, Jamaica. October 25, 1913. (Morgan Hebard; among dead leaves in heavy leaf mould under dense hillside scrub.) [Hebard Collection, Type No. 482.]

Size small; form elliptical; tegmina abbreviate, quadrate; wings lobiform, covered; surface polished.

Head very narrowly visible cephalad of pronotum when seen from dorsum. General form of head short and broad pyriform, the greatest width across eyes subequal to depth of head; occiput moderately arcuate, eyes widely separated, the interspace little less than twice occipital depth of eye; ocellar spots of medium size, ovate, sharply contrasted in coloration, very faintly more approximate than eyes; antennal scrobes equidistant with eyes in their separation; face subdeplanate longitudinally, moderately arcuate transversely. Palpi short, yet relatively large and heavy; third joint deeper than usual, subcompressed, weakly arcuate proximad; fourth joint about three-quarters of length of third joint, strongly infundibuliform, distal margin laterad obliquely truncate; fifth (distal) joint subequal in length to the third joint when seen from dorsum, strongly inflated on external side, when seen from dorsum elliptical in outline, apex faintly rectangulate, in profile subdepressed with ventral margin arcuato-truncate. Eyes not prominent, strongly reniform in basal outline, broad cephalad, moderately narrowed ventrad. Antennæ with proximal joint moderately enlarged.

Pronotum as described under *N. cubensis*.

Tegmina corneous, quadrate, reaching to the base of the proximal tergite, attingent and narrowly overlapping at sutural margins; costal margin weakly arcuate, disto-costal angle broadly rounded rectangulate, distal margin truncate with a faint arcuate emargination, disto-sutural angle narrowly rounded rectangulate, sutural margin straight. Marginal field imperfectly defined, anal field not indicated; venation obsolete, not indicated except by a tracheiform development of humeral trunk. Wings lobiform lateral articulate pads, not reaching caudad of the margin of the metanotum, completely covered by the tegmina.

Mesonotum¹ with its margin in general form broadly arcuate, a weak and narrow marginal integument developed into a median angulate point and a pair of lateral obtuse angulations. Metanotum with the marginal integument more developed, similar to that in *N. cubensis*. Median segment with margin arcuate.

Abdomen deplanate dorsad; tergites with lateral margins cingulate, less distinctly so on ultimate tergite, disto-lateral angles slightly acute on all except ultimate exposed tergite, there they are subrectangulate; tergites with distal margin as follows;

¹The characters of the mesonotum and metanotum taken from paratypes, as we do not desire to damage the type to see these structures.

sinuate weak arcuate on proximal tergite, more nearly truncate on second one, weakly arcuate emarginate thence to ultimate exposed tergite, which has the margin truncate. Supra-anal plate as in *N. cubensis*, but less distinctly bilobate. Cerci relatively short, stout, fusiform, composed of nine segments, tapering in distal two-fifths, there moniliform, apex subacute. Subgenital plate slightly asymmetrical, of medium size; margin as seen from venter weakly arcuate convergent on sinistral side, with a shallow but evident cercal emargination; apex mesad, obtuse-angulate, dextral portion of margin in general arcuate with no cercal emargination; from dorsum the plate is seen to have mesad an internal accessory shelf, which bears the sinistral style: sinistral style slender, elongate, acuminate, its surface covered with recurved, shagreenous spicules, like a dentist's broach, to which it bears a very great resemblance; dextral style not evident.

Limbs in general much as in *N. cubensis*, except as follows: ventro-caudal margin of cephalic femora with four spaced spines, none in proximal two-fifths, Caudal metatarsus appreciably longer than the succeeding joints united.

ALLOTYPE.—Female; same data as type. [Hebard Collection.]

Differing from the description of the type in the following features.

Ocellar spots proportionately smaller than in male. Palpi with fifth joint less inflated laterad than in male.

Abdominal tergites with disto-lateral angles less produced than in male, more rectangular, becoming obtuse on penultimate exposed tergite, strongly obtuse on ultimate exposed one; distal margin of tergites as in male on proximal one, thence truncate to the ultimate tergite, which has it weakly arcuate mesad. Supra-anal plate broad trigonal, slightly transverse; distal margin narrowly and shallowly bilobate mesad; surface concavely depressed laterad. Cerci as in male but proportionately more robust, less attenuate distad, non-moniliform. Subgenital plate broad transverse; distal margin with lateral sections converging to cercal emarginations, which are moderately pronounced and arcuate; median section of the margin, between cercal emarginations, broadly arcuate, weakly flattened and also very faintly and shallowly arcuate-emarginate mesad.

Surface of the disk of the pronotum, dorsal surface of abdomen and discoidal and anal fields of tegmina ranging from chestnut, through deep maroon, to blackish brown; indefinite narrow lateral marginal section of pronotum, costal region of tegmina and occasionally lateral marginal series of spots on the dorsum of the abdomen ranging from primuline yellow to ochraceous-orange. Disk of pronotum rarely with subobsolete traces of a paler medio-longitudinal line. Abdomen occasionally with lateral series of yellow spots, infrequently weak and reduced in size, little contrasted (allotype), when present generally forming a nearly continuous margin laterad, in the recessively colored specimens connected by a transverse bar caudad on the ultimate tergite, entirely absent in a number of the series; supra-anal plate unicolorous, or mesad or mesad and marginally with yellowish. Head uniformly of the color of the disk of the pronotum; eyes fuscous to blackish. Limbs ranging from ochraceous orange through zinc orange to clay color, the coxæ occasionally paling to antimony yellow, the median and caudal coxæ broadly, and the cephalic coxæ very narrowly, of the dark dorsal color proximad. Palpi and mouth-parts warm buff to antimony yellow; two distal palpal joints occasionally suffused with dark color; antennæ of the palpal color, suffused distad to a variable extent with bister, rarely showing suffusion to and involving the proximal segment. Ventral surface of ab-

domen of dark dorsal color. Cerci above of the pale abdominal marginal color, occasionally suffused with the dark color proximad or as on ventral surface; ventral surface with segments individually blackish brown, edged distad with pale yellowish. The immature specimens have the meso- and metanotum edged laterad with the pale bordering color.

MEASUREMENTS

	Length of of Body	Length of Pronotum	Greatest Width of Pronotum
♂, Stony Hill, Jamaica, type.....	9.4	3.2	4.5mm.
♂, Stony Hill, Jamaica, paratype.....	8.9	3	4.2
♂, Stony Hill, Jamaica, paratype.....	9.5	3	4.4
♀, Stony Hill, Jamaica, allotype.....	12.3	4.2	6
♀, Stony Hill, Jamaica, paratype.....	11.4	3.9	5.4
♀, Montego Bay, Jamaica, paratype.....	10.3	3.5	5.2
♀, Montego Bay, Jamaica, paratype.....	11.4	3.4	4.8

	Length of Tegmen	Greatest Width of Tegmen	Width of Abdomen
♂, Stony Hill, Jamaica, type.....	3	2.9	4.6 mm.
♂, Stony Hill, Jamaica, paratype.....	2.8	2.7	4.5
♂, Stony Hill, Jamaica, paratype.....	3.2	3	5
♀, Stony Hill, Jamaica, allotype.....	4.3	3.8	6.7
♀, Stony Hill, Jamaica, paratype.....	3.6	3.5	6.5
♀, Montego Bay, Jamaica, paratype.....	3.6	3.4	6.2
♀, Montego Bay, Jamaica, paratype.....	3.2	3.1	5.8

In addition to the type and allotype we have before us the following.

Same data as type, 5♂, 1♀, 1 immat. ♂, 4 immat. ♀, [Hebard Cln. and A. N. S. P.].

Pleasant Hill, Blue Mountains, Jamaica, elevation, 3660-3800 feet, July 21, 24 and 28, 1923, (Rehn; under stones and about bases of banana trees in ground litter), 4♂, 3♀, 3 immat. ♂, 2 immat. ♀, [A. N. S. P.].

Cinchona, Blue Mountains, Jamaica, elevation, 4900 feet, February 24, 1911, 1 immat. ♀.

Morces Gap, Blue Mountains, Jamaica, elevation, 4980 feet, July 29-30, 1923, (Rehn; in bromeliads), 1♂, 1 immat. ♀, [A. N. S. P.].

West slope of Sir John Peter Grant Peak, elevation, 5700 feet, July 26, 1923, (Rehn; under bark of tree in dense ridge type forest), 1♀, [A. N. S. P.].

Cumberland District, Clarendon Parish, Jamaica, elevation, about 3000 feet, December 15-18, 1919, (F. E. Watson), 1 ♀.

Mandeville, Manchester Parish, (Stewardson and Amos P. Brown), 1 ♀ (broken), [A. N. S. P.].

Montego Bay, St. James Parish, Jamaica November 3, 1913, (Hebard; from large dead agave growing in scrub forest), 3 ♀, 1 immat. ♀, [Hebard Cln.].

We consider paratypic all the adults above listed, with the exception of the broken Mandeville female.

We find no structural features of variation sufficiently important to note, except that numerous tarsi in the series possess but four joints. There appears to be no rule or order in the association of four joints with certain pairs of limbs.

As a whole the Blue Mountain series is more uniformly dark than those from the lower elevations, particularly in the coloration of the dorsal surface of the abdomen. In teneral individuals the tegmina appear distinctly lighter than in the fully hardened specimens.

It is evident that the present species is widely distributed within the island of Jamaica, occurring from the vicinity of sea-level to as high as fifty-seven hundred feet elevation, and under conditions as varied as in bromeliads in mountain cloud-drenched forest, in dead agave in scrub forest and under litter in stands of banana.

Apparently this insect occurs adult nearly or quite throughout the year.

EUPHYLLODROMIA Shelford

This tropical American genus comprises a considerable number of species, distributed from southern Mexico to Brazil, with the center of greatest differentiation in the Guianan and Amazonian regions. The genus represents a distinct genera group of the subfamily, certain of whose components are Old World types.

The genus *Nymphodromia*, described above, has more the character of an annectant link with the Blattellæ Group than anything previously known, but the exact relationship of the Pseudophyllodromiæ, in which we place *Euphyllodromia*, is still undetermined. When the Old World relatives are better understood we will be in a position to state more definitely the relationship of this genera group to the far larger assemblages called the Blattellæ and Ischnoptera.

The species are all strikingly colored, highly polished forms, with the head and body markedly depressed and the venation distinctive. Two

species have been described from the West Indies, neither of which are in the collections before us. It is evident both of these species reached the southern Lesser Antilles, where they are found, from South America. The two species may be distinguished by the following key, made from the original descriptions.

(Female sex alone known)

- Head with pale line between eyes. Antennæ castaneous. Pronotal disk chestnut, with two longitudinal white lines; cephalic and caudal margins of pronotum marked with white. Tegmina castaneous, veins white. Abdomen and cerci ferruginous. *albinervis* (Brunner).
 Head with fuscous line between eyes. Antennæ black. Pronotal disk yellow, marked with two longitudinal lyrate black lines and a shorter median black line. Tegmina hyalino-testaceous, veins fuscous; tegmina beyond middle obliquely marked with fuscous. Abdomen and cerci fuscous. *semivitrea* (Brunner).

***Euphyllodromia*¹ *albinervis* (Brunner)**

P[seudophyllodromia] albinervis BRUNNER, 1893, Proc. Zool. Soc. London, p. 602. ♀; Mount Gay Estate (leeward side), Grenada, West Indies.

This species has not been recorded since the original description.

***Euphyllodromia semivitrea* (Brunner)**

P[seudophyllodromia] semivitrea BRUNNER, 1892, idem, p. 203, Pl. xv, fig. 2. ♀; St. Vincent (windward side), West Indies.

Like *E. albinervis* this species has not been recorded since the original description.

Blattinæ

We are placing the subfamily Blattinæ immediately after the Pseudomopinæ in linear arrangement of the family, as we are convinced the two groups are of sufficiently close relationship to be so placed, although the idea of combining them, as has been suggested, is felt to be unwise and unwarranted. On the other hand the separation of the two groups by the Nyctiborinæ and the Epilamprinæ, as is the method followed by most classifications, is becoming increasingly indefensible, particularly as our knowledge of the real affinity of the Epilamprinæ and the Panchlorinæ becomes more conclusive. At this writing it is only fair to say that we are open-minded regarding the proper sequence of the subfamilies of the Blattidæ and are endeavoring to devise a logical and, as far as possible, natural arrangement. The results so far achieved have been slight, chiefly because the number of genera to be considered and the diversity

¹For discussion of this name as distinct from *Pseudophyllodromia*, see Hebard, 1920, Mem. Amer. Entom. Soc., No. 4, p. 82.

of structure encountered, combined with a variability in many features and the prevalence of sexual dimorphism, is so great. These factors make the recognition of group characters a matter of the utmost difficulty.

The sequence in which the West Indian genera of the Blattina are treated in this study represents our idea of their natural arrangement. The following key is a purely artificial one to enable the student to place his material generically.

KEY TO THE GENERA OF THE WEST INDIAN BLATTINÆ

1. Caudal metatarsus robust, relatively short, distinctly shorter than remaining tarsal joints, strongly compressed. Ventral surface of second and third joints of caudal tarsi unspined; ventral of caudal metatarsus spined..... 2.
 Caudal metatarsus slender, elongate, not distinctly shorter than remaining tarsal joints. Ventral surface of second and third joints of caudal tarsi bearing spinulations similar to those of ventral surface of caudal metatarsus. (Tegmina fully developed to lateral and lobiform.) 3.
2. Tegmina truncate, but obliquely so, with distal angle at sutural margin the more produced (little evident in *P. occidentalis*), or fully developed, never lateral trigonal pads. (All are chiefly dark species with dorsal surface including tegmina polished and frequently showing a purplish sheen.)
 Pelmatosilpha Dohrn.
 Tegmina transverse truncate, or more decidedly reduced and lateral. (Dark species have dorsal surface of body and tegmina roughened, a number of species of pale base coloration have strikingly different dark patterns.)
 Eurycotis Stål.
3. Arolia absent. (Size medium. Tegmina and wings of male covering about two-thirds of abdomen, truncate distad; tegmina of female lateral trigonal pads, not attingent mesad; wings absent in female. General coloration shining blackish chestnut-brown (♂) or blackish brown (♀). Dorsal surface of male abdomen unspecialized. Supra-anal plate of male transverse sub-rectangulate.)..... *Blatta* Linnæus.
 Arolia present..... 4.
4. Tegmina lateral, sublanceolate; wings absent. Caudal tarsus extremely slender. Caudal metatarsus four-fifths as long as caudal tibia. Pulvilli present solely on fourth joint of all tarsi. Supra-anal plate of female transverse, distal margin weakly arcuate, not emarginate..... *Henicotyle*, new genus.
 Tegmina and wings fully developed. Caudal tarsus moderately slender. Caudal metatarsus about one-half as long as caudal tibia. Pulvilli present on four proximal tarsal joints. Supra-anal plate of female rostrate, emarginate mesad..... *Periplaneta* Burmeister.

PELMATOSILPHA Dohrn

Pelmatosilpha DOHRN, 1887, Entom. Zeitung Stettin, XLVIII, p. 410.

GENOTYPE (indicated by Kirby, 1904).—*P. alaris* (Saussure).

The exact relationship of the present genus to *Eurycotis* is still uncertain, and efforts to find characters to consistently separate species, which on general appearance would be placed in one or the other genus, have been rewarded with but temporary success. That *Pelmatosilpha* is extremely close to *Eurycotis* is evident to any one who has given them any study, yet at the same time the two groups seem to be sufficiently distinguishable to the trained eye. As represented by the genotypes the two genera are quite distinct, and as far as the West Indian forms are concerned little difficulty is likely to be encountered in referring species to one or the other group, except in the case of *P. occidentalis* which has subquadrate tegmina. The South American species, however, greatly complicate the situation, and until we have a better understanding of them the exact relationship of the genera cannot be convincingly determined. We feel the most satisfactory arrangement at the present time would be to permit both groups to stand as generic entities, if necessary rearranging the species in conformity with what appears to be their proper position in relation to the respective genotypes. If the future shows such an arrangement produces a completely intergrading series of species, no other course will be open but to synonymize the name *Pelmatosilpha* under *Eurycotis*.

In the West Indies *Pelmatosilpha* occurs only in the Lesser Antilles and the easternmost of the Greater Antilles, to the westward its place being taken, apparently, by various species of *Eurycotis*, which latter genus in the Lesser Antilles is definitely known only from Antigua and possibly St. Barthelomew. The present genus is elsewhere of South and Central American distribution, one record from Texas being in all probability of an adventive individual.

KEY TO WEST INDIAN SPECIES OF *Pelmatosilpha*

This table is based solely on the more evident features of the species and to that extent it is superficial, as we possess but a single imperfect specimen of one of the forms (*marginalis*). The sequence of the specific treatments represents our idea of the linear arrangement of the species.

1. General coloration dark with broad lateral yellow pronotal bands. Coxæ pale. .2.
General coloration uniformly dark, no yellow pronotal bands. Coxæ dark, of the
general color. (Tegmina very deep maroon.) [Martinique and St. Lucia.]
occidentalis (Saussure).
2. Lateral yellow pronotal bands continued upon the tegmina, occupying virtually
all of their marginal field. 3.

coriacea Rehn.

¹From Baños de Coamo specimen.

pronotal disk, the costal and distal margins continuously and regularly arcuate to the narrowly rounded disto-sutural apex. Whether this is really a sexual difference, or an individual one, we cannot determine from the small series available, but it is evident that the differences are not specific features. In the males the dorsum of the abdomen bears semicircular pale markings laterad on each segment, in the usual position of such markings in this and related genera; in the female these dorsal markings are subobsolete (proximad) to obsolete (distad). On the ventral surface similar markings are indicated in both sexes. The coxæ are proximad infusate to a variable degree, while the femora vary from deeply rufescent to ochraceous.

The caudal tibiæ of the male are appreciably more expanded in proportion to their length than in the female sex.

This species is apparently limited in its distribution to Porto Rico and Mona Island.

***Pelmatosilpha purpurascens* (Kirby)**

Plates XI, Figures 12 and 13; XII, Figures 1 and 2

Periplaneta purpurascens KIRBY, 1903, Ann. and Mag. Nat. Hist., (7) XII, p. 375. Sex?; Dominica.

DOMINICA.—Fore Hunt Flat, elevation 1350 feet, VI, 27, 1911, (Miner; in decaying logs in forest), 1 ♂. Long Ditton, VI, 17–20, 1921, (Lutz; taken with light at night), 3 ♂, 1 ♀, 2 immature ♂, 1 immature ♀, 2 small immature individuals. Laudet, VI, 11, 1911, (Lutz), 1 immature ♀.

MONTSERRAT.—Plymouth, III, 1894, (C. V. Riley), 1 immature ♂, [U. S. N. M.].

ANTIGUA.—No exact locality, II, 10, 1913, (P. G. Russell), 1 immature ♀, [U. S. N. M.].

This species is closely related to *P. coriacea*, but is a distinctly larger form, with more elongate and proportionately less robust limbs, the caudal tibiæ being more subequal in width in distal two-thirds and less fusiform than in *P. coriacea*, particularly in the male sex; also with truncato-concave instead of arcuate distal margin of the male subgenital plate and distinctive features of the concealed genitalia of the male. The male genital features not having been described it appears desirable to give those of diagnostic importance.¹

Supra-anal plate with its general form very much as in *P. coriacea*, but proportionately somewhat broader distad, and with rounding of lateral into distal margins

¹From male labelled "Long Ditton, June 17, 1911."

more evident, while the distal margin is broadly subarcuate emarginate; surface of plate weakly tectate mesad. Cerci similar to those of *coriacea* but faintly shorter and appreciably more slender. Subgenital plate strongly transverse, stylar pockets deeply arcuate emarginate, distal margin broadly truncato-concave: styles similar to those of *coriacea* but slightly coarser and virtually straight. Dextral concealed process broad and lamellate proximad, passing more regularly than in *coriacea* into an elongate, nearly straight aciculation, which is directed meso-dorsad. Sinistral concealed process straight, the apex recurved, narrowed, then expanded into a truncate head, which is narrowly rounded distad, and acute but not spiniform proximad.

The adults of the present series are approximately uniform in their tegminal development, but Shelford's figure of the species,¹ presumably taken from the type, which is probably a female although not specified as such by Kirby, shows that the same tegminal variation noticed above under *coriacea* occurs in this species. In all the adults the pale lateral bars are strongly marked from cephalic margin of pronotum to the disto-costal portion of the tegmina. Pale markings laterad on the abdominal segments occasionally are weakly indicated proximad on both dorsal and ventral surfaces, but these are generally absent. The immature individuals represent three instars, and in all but two Dominican specimens in the two instars preceding maturity are the pale lateral areas indicated with greater or lesser distinctness. The Antigua immature shows that the disk of the thoracic segments may be pale to a variable degree, making the dark areas broad reversed V-shaped on the pronotum and lateral, caudad connected, bars on the meso- and metathorax.

The known range of this species is seen to be limited to the northern section of the Lesser Antilles. The localities given above are all known for the species.

***Pelmatosilpha marginalis* Brunner**

P[elmatosilpha] marginalis BRUNNER, 1893, Proc. Zoöl. Soc. London, p. 603, Pl. LII, fig. 2. ♂; Balthazar, Grenada.

GRENADA.—No exact locality, (Mrs. W. E. Broadway), 1 specimen without abdomen, [Hebard Cln.].

This imperfect specimen shows that the pale lateral markings do not broadly reach the caudal margin of the pronotum, as in the two species treated above, but are separated by a narrow area of the dark discal color, while the lack of pale color on the costal portion of the tegmina is a very evident, though possibly variable, feature. The outline is less truncate caudad than in the other species, but this may prove to be purely individual. The tibiae, tarsi and distal sections

¹1910, 'Gen. Insect.', fasc. 109, Blattidæ, Blattinæ, Pl. II, fig. 15.

of the femora are strongly infusate, except the base of the distal tarsal joint, which is ochraceous, similar to the greater portion of the femora. The penultimate palpal joint is also infusate, sharply contrasted with the remaining ochraceous portions of the palpi.

***Pelmatosilpha occidentalis* (Saussure)**

Plate XII, Figures 3 to 5

Peripl[aneta] occidentalis SAUSSURE, 1864, Rev. at Mag. de Zool., (2) XVI, p. 318. ♀; Antilles.¹

MARTINIQUE.—St. Pierre, 1902, (J. Waddy), 1 ♂, 1 ♀, [Hebard Collection].

ST. LUCIA.—Castries, IX, 10-22, 1919. (J. C. Bradley), 1 immature ♂, [Cornell Univ.]. Union, near Castries, IX, 17, 1919, (J. C. Bradley), 1 ♂, 1 immature ♂, [Cornell Univ.].

This species is uniformly colored and recognizable at once, when compared with the other West Indian members of the genus, by its lack of marked color contrast, the dorsal tone being uniform blackish to very deep maroon, with the tegmina hardly contrasted with the general coloration. Our previous knowledge of the species consists solely of the original description, which is quite brief and based on the female sex, and another, more complete, yet unsatisfactory description by the original author.² Bolivar³ and Gundlach⁴ have recorded the insect from Cuba, but the material examined by both of them, as shown by Gundlach's comments and comparison with the original description, clearly did not represent this species, probably being one of the immature stages of some one of the species of *Eurycotis* recorded by us from the Guantanamo region of Cuba.

It is very possible *occidentalis* is restricted in distribution to the islands of Martinique and St. Lucia. The Lesser Antilles to the north are inhabited, at least in part, by the related *P. purpurascens*, while to the south, in Grenada, occurs *P. marginalis*. What form or forms, if any, of this genus occur in St. Vincent and Barbados is at present unknown.

In features other than coloration *occidentalis* differs markedly from *coriacea* and *purpurascens*, in both sexes in the shape of the supra-anal plate, which is more truly trigonal, and in the much blunter cercal apices, while the more quadrate tegmina are equally diagnostic, of more decided character in the female than in the male. From *P. marginalis* Brunner,

¹In a contemporaneous and more complete description (1864, Mém. Hist. Nat. Mexiq., IV, p. 74) Saussure gives "Martinique" as the locality.

²1864, 'Mém. Hist. Nat. Mexiq.,' IV, p. 74.

³1888, Mém. Soc. Zool. France, I, p. 126. [Cuba.]

⁴1890, 'Contr. Entom. Cubana,' IV, p. 306. [Monte Toro, Guantanamo, Cuba.]

from Grenada, the present species is distinguishable by the subquadrate tegmina, as well as the absence of lateral yellow bars on the pronotum. Our material of *marginalis* does not permit us to speak of genitalic features as it lacks the abdomen.

The previous descriptions of this species are so imperfect it seems advisable to give a summary of the ambisexual characters, and also of the genital features of both sexes, the male having been unknown previously. These characters have been drawn chiefly from the St. Pierre pair.

Male.—Form as usual in this genus; surface smooth, polished, abdomen faintly and sparsely punctate, tegmina finely cribroso-punctate.

Head almost completely hidden under pronotum, as usual in genus very broad, greatest width across eyes subequal to greatest depth of head; occiput broadly arcuate, occipital interspace between eyes very great, equal to one-half entire width of head.

Pronotum of type usual in genus, greatest length contained one and one-third times in greatest caudal width; cephalic margin subtruncate dorsad of head, passing into diverging, moderately arcuate lateral margins; caudo-lateral angles rounded rectangulate; caudal margin subtruncate with an extremely faint median angulation; all margins cingulate, narrowly so caudad; in transverse section pronotum is strongly and regularly arcuate. Tegmina abbreviate, subquadrate, no longer than pronotum: costal margin weakly arcuate, narrowly rounding into the weakly oblique and subtruncate distal margin; disto-sutural angle narrowly rounded rectangulate; sutural margins nearly straight, narrowly overlapping: no clearly and continuously defined venation indicated, but anal sulcus well marked distad, where it reaches sutural margin at one-fifth its length from disto-sutural angle; humeral trunk weakly indicated; venation of discoidal and anal fields evident solely by the disposition of punctures; marginal field not reflexed or deplanate. Wings rudimentary, completely hidden under tegmina.

Abdomen broad subfusiform, moderately deplanate. Supra-anal plate proximad transverse, mesad subtrigonally produced, apex of projection markedly and rather deeply V-emarginate, forming a bilobate extremity; produced section of plate weakly tectate in section. Cerci subequal to median length of supra-anal plate, dorsad deplanate, apex bluntly acuminate. Subgenital plate transverse, interstyler portion of margin arcuato-truncate; styles nearly as long as median section of plate, equal, tapering, faintly incurved. Sinistral concealed genital process with apex curved at right angle to shaft and head expanded and flattened into a process with two acute angles, the distal much more prominent and acute, the proximal less acute, margin between obtuse-angulate emarginate (Plate XII, fig. 5). Character of dextral concealed genital process not clearly evident in the single male before us.

Limbs robust, caudal tibiae moderately inflated (see comment below), extensor surface of latter deeply grooved at spine bases. Caudal metatarsi slightly shorter than remaining tarsal joints combined.

Female.—Differing from the above description of male in the following features. Supra-anal plate, as a whole, more trigonal and less transverse proximad; distal emargination deeper, broad, more sharply V-emarginate, the bilobations more angulate. Cerci slightly blunter distad than in male.

General color of head, pronotum and abdomen, shining black to very deep maroon, the blackish individuals showing faint areas of maroon to claret brown at the cercal bases, margins of supra-anal plate and rarely on median line of pronotum. Tegmina dark maroon, darker suturad. Head with eyes bister; ocellar spots, facio-clypeal suture and distal palpal joints orange to xanthine orange; antennæ chestnut, paling to orange-rufous distad. Cerci very narrowly tipped with orange-rufous. Limbs maroon to deep chestnut, the caudal tibiæ, and to some extent the cephalic and median pairs, and distal extremities of all the femora blackish; tarsi similar in color to tibiæ, but with distal portion orange-rufous, on the caudal tarsi limited to distal joint, claws and arolia, on median and cephalic tarsi less sharply contrasted and more extensive, passing into general color proximad.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♂, St. Pierre, Martinique.....	22.2	6.8	9.1	6.5
♂, Union, St. Lucia.....	18.5	6.5	8.4	5.7
♀, St. Pierre, Martinique.....	23.2	7.3	9.5	6.3

	Greatest Width of Tegmen	Greatest Width of Abdomen	Length of Caudal Tibia
♂, St. Pierre, Martinique.....	6.5	10.6	7.2 mm.
♂, Union, St. Lucia.....	5.6	9.6	6.9
♀, St. Pierre, Martinique.....	6.6	11.3	8

Whether the smaller size of the St. Lucia male is geographic or individual in character remains to be determined. This specimen, however, shows one noteworthy feature of difference from the Martinique male. The caudal tibiæ are appreciably more inflated in the Martinique male than in the St. Lucia one, the latter in this respect having the tendency even less developed than in the Martinique female. The St. Lucia immature males, which represent two instars, however, have these parts somewhat more inflated than in the adult from the same island. Considering the fixity of this feature in the related genus *Eurycotis*, variability in *Pelmatosilpha* is puzzling, but it is quite possible that the adult specimen from St. Lucia may be depauperate, as witness its size, and that, as is true of certain Orthoptera, undersized specimens do not develop the more marked condition of features of this type.

This species in general appearance closely resembles the South American species *P. cothurnaria* (Giglio-Tos) and *micra* Hebard, having

much the same type of coloration and tegmina approximating theirs in shape. *Cothurnaria* is readily distinguishable by the squarely truncate distal extremity of the tegmina and the undivided male supra-anal plate, as well as the complete and non-emarginate median portion of the margin of the subgenital plate of the same sex, and contrasted femoral and tibial coloration. The Colombian *micra*, however, is exceedingly close, but the cerci of *occidentalis* are blunter, the general size of the same is distinctly greater, and the supra-anal plate of the male is apparently different, as that of *micra* is presumably entire,¹ similar to *cothurnaria*.

EURYCOTIS Stål

Eurycotis STÅL, 1874, Bihang K. Svenska Vetensk.-Akad. Handl., (13) II, p. 13.
GENOTYPE (by monotypy).—*Polyzosteria rufovittata* Brunner.

The genus *Eurycotis* is one of the most puzzling assemblages to be found in the West Indian blattid fauna. It has given much trouble to workers in the past and we are by no means convinced that our present interpretation will not be subject to some future modifications. However, we feel certain that this, the first really serious effort to ascertain something of the true relationship of the West Indian forms of these interesting cockroaches, is logical and warranted by the evidence. The greatest difficulties in the past have been due to the failure of workers to distinguish between individually variable color features and specific color types in the genus, and also to the lack of recognition of immature material as such. The color feature difficulty, however, has been explained to a considerable degree by the authors in various papers treating of the North American *E. floridana*, which exhibits striking individual color variation, paralleled in the Cuban *E. opaca*. There is one interesting group of the genus, however, which exhibits remarkable color fixity within specific limits, although within the group there is much color diversity.

To better understand the generic tendencies it is well to state that *Eurycotis* in the West Indies is divisible into four groups, into which the forms described from other regions also may be assembled, but, due to a lack of available material, we do not feel qualified at this writing to speak with the same authority regarding the South and Central American species as we do of the West Indian forms. These four groups are: (1) species of glabrous or shining, almost impunctate surface, with tegmina lateral or quadrate, but not attingent, largely with variegated color pattern; (2) species of smooth surface, black body, highly special-

¹The plate of the unique male of *micra* is asymmetrical and partially aborted, owing to lack of development or injury to the dextral portion of the margin. The margin is, however, of such character that we believe in normal condition it is entire, and not divided as in *occidentalis*.

ized caudal tibiæ and lateral tegmina; (3) species of smooth surface, pale base color of head, thorax and tegmina, marked with dark, dark abdomen and quadrate and attingent tegmina; (4) species with coriaceous or corneous integument (with shining surfaces in immature individuals), with numerous punctulations and transverse, attingent or lateral tegmina. The first group comprises a number of West Indian species here treated. The second group is represented in the West Indies by *E. tibialis* of Hispaniola. The third group is a more generally South American one, represented in the West Indies solely by *E. similis* of Antigua. The fourth group comprises *E. opaca*, *taurus* and *E. cribrosa* of Cuba and the North American *E. floridana*. The two extremes of conditions in the genus as found in the West Indies are exemplified by *E. lacernata* and *E. cribrosa*, the former depressed in form, with surface very much polished, impunctate, with a bold bicolored pattern, consisting of a solid median dark body color and nearly complete pale lateral bars; the latter much less depressed, with corneous, deeply punctate integument and solid black body color with contrasted tegmina.

The first group is the one which has required the greatest study and our more perplexing problems have been concerning the forms of which it is composed. We have found certain features to be useful in the separation of apparently closely related forms, features of the external and concealed genitalia, the inflation and shape of the caudal tibiæ and the character of the extensor surface of the same, as well as the extent of the caudal metatarsal pulvillus, all of which have not been referred to at all, or, in the case of the external genitalia, in a very casual way, in the past.

Before treating the species of the genus it seems desirable to speak of certain tendencies which are apparent in the genus, as evidenced by an examination of the rather closely related species of the first group mentioned above. The first one is of structure and can best be called a tendency toward quadration of the tegmina, in a group in which they are more normally lateral and sublanceolate or lobiform. This tendency is seen in group one in *torquinensis* and *caraïbea*. The second feature is also one of structure and can be referred to as the caudal tibial inflation tendency, being a regular, subfusiform inflation of the article, when seen from the dorsal or ventral surface, sometimes accompanied by a flattening tendency. The difference is sharp and evident in species as closely related as *dimidiata* and *scalaris*, the former with distinctly inflated tibiæ, the latter with the more normal type. Evident inflation of the caudal tibiæ is found in all of the species of the group except *E. bahamensis*, *scalaris* and *caraïbea*.

The other tendencies are all of coloration and are found combined to variable degrees in most of the species of the first group. They are of blocking, transverse lining and longitudinal paired barring characters. The blocking type is indicated in a solidly dark apex of the abdomen, which involves all of the supra-anal plate, forms without this having the supra-anal plate particolored. This blocking is evident in all the species of the group except *ferrum-equinum* and *galeoides*. The transverse dark lining is of the proximal and median dorsal abdominal segments and is indicated in all the species but *lacernata*, *bahamensis* and *caraibea*. The longitudinal paired dark barring ranges from one type where this tendency is indicated solely on the pronotum (*torquinensis*), to the other extreme where, apparently by a fusion of complete longitudinal bars, we have a solid dark mantle over most of the dorsum, as in *lacernata*. Intermediate stages in the development of the longitudinal pattern are indicated by the immature condition of *ferrum-equinum*, where the paired bars are fairly evident from the pronotum to the apex of the abdomen; the adult of the same species, where the paired bars on the pronotum fuse into a horse-shoe-shaped marking; and in *bahamensis*, where the solidity of the dorsal mantle is confined to the proximal abdominal segments. The tegmina are generally free of the markings, but are involved in *torquinensis*. Of the species of this group *galeiodes*, *dimidiata*, *scalaris* and *caraibea* do not have the longitudinal barring.

KEY TO THE WEST INDIAN SPECIES OF *Eurycotis*¹

1. Caudal tibiæ without a distinct and decided, depressed expansion mesad, as seen from above.....2.
Caudal tibiæ with a distinct and decided, depressed expansion mesad. (Tegmina lateral.).....14.
2. Tegmina non-attinent, not transverse. Size smaller.....3.
Tegmina attinent, transverse.....12.
3. Surface nearly or quite impunctate. Color of body not solidly black, tegminal coloration not sharply contrasted with that of body.....4.
Surface deeply, though rather sparsely, punctate. Color of body solidly black, tegminal coloration sharply contrasted with that of body. [Cuba.]
cribrosa, new species.
4. Dorsum of body with a solid, broad, medio-longitudinal dark bar, apex of abdomen dark; broad, solid and continuous pale lateral marginal bars sharply contrasted. (Face with T-shaped dark marking. Caudal tibiæ subfusiform inflated, dark.) [Cuba.].....*lacernata* Cabrera.
Dorsum of body without a solid, medio-longitudinal dark bar, apex of abdomen dark or similar to proximal portion of abdomen; without broad, solid and continuous, sharply contrasted, pale lateral bars.....5.

¹This key is largely artificial and is presented with full knowledge of its character.

5. Caudal metatarsi with pulvilli equalling two-thirds of metatarsal length. Abdomen dorsad with proximal tergites solidly dark mesad. Face with two transverse bars in addition to the interocular one. (Tegmina lateral.) [Bahamas.] *bahamensis* Rehn.
Caudal metatarsi with pulvilli equal to distinctly less than one-half length of metatarsus. Abdomen without solid dark color mesad on proximal tergites. Face without two transverse bars, or with a single medio-longitudinal dark marking (*torquinensis*) 6.
6. Face and occiput with a single, large, triangular dark marking, the base on the occiput, the apex ventro-caudad. Tegmina subquadrate, marked with dark pattern on sutural half. Pronotum with dark longitudinal pattern represented by a well-separated pair of lanceolate-reniform dark spots. [Cuba.] *torquinensis*, new species.
Face and occiput without a large, triangular dark marking. Tegmina latera and lobiform, or sub-quadrate, never marked with the dark pattern.
Pronotum with dark marking, when present, in the form of a horse-shoe.¹ ... 7.
7. Pronotum with contrasted dark discal pattern. Caudal margin of pronotum, mesonotum and metanotum rather broadly bordered with blackish, (Tegmina lateral and lobiform.) 8.
Pronotum without contrasted dark discal pattern. Caudal margin of pronotum, mesonotum and metanotum very narrowly or subobsoletely bordered with blackish. 9.
8. Caudal tibiæ infusate. Proximal abdominal tergites with blackish distal marginal bars reaching the lateral margins of tergites; apex of abdomen solidly dark dorsad. Supra-anal plate of male solidly dark, its distal margin bilobate. [Cuba.] *balteata* Cabrera.
Caudal tibiæ pale, not infusate. Proximal abdominal tergites with blackish distal marginal bars not reaching to lateral margins of tergites; apex of abdomen not solidly dark dorsad. Supra-anal plate of male bicolored, its distal margin broadly subtruncate. [Cuba.] *ferrum-equinum*, new species.
9. Proximal abdominal tergites with dark margins. Tegmina lateral, lobiform, or weakly subquadrate (*galeodes*) 10.
Proximal abdominal tergites without dark margins. Tegmina subquadrate, slightly transverse, separated mesad by less than half the width of a single tegmen. (Caudal tibiæ not appreciably inflated; distal portion of same not infusate. Supra-anal plate of male subtruncate distad, with a small, median, shallow V-emargination. [Cuba.] *caraibea* (Bolivar).
10. Caudal tibiæ inflated. Proximal abdominal tergites with dark margins not broadly expanding laterad. 11.
Caudal tibiæ not inflated. Proximal abdominal tergites with their dark margins not reaching the lateral margins, but laterad and intermarginally regularly and broadly widening, so as there to cover the entire length of segment. (Dorsal apex of abdomen solidly dark. Distal portion of caudal tibiæ distinctly but narrowly infusate. Supra-anal plate of male bilobate distad.) [Cuba.] *scalaris*, new species.

¹Very rarely this is narrowly divided, but never as distinctly as in *torquinensis*.

11. Dorsal apex of abdomen not solidly dark; supra-anal plate bicolored. Ventral surface of abdomen with broad, entire, usually imperfectly defined, pale lateral borders. Interocular bar rufescent. Caudal tibiae proportionately longer, weakly yet distinctly inflated; distal portion of caudal tibiae not heavily infusate. (Tegmina weakly subquadrate.) [Cuba.]

galeoides, new species.

Dorsal apex of abdomen solidly dark; supra-anal plate solidly dark. Ventral surface of abdomen solidly dark except for very narrow, pale lateral borders on the proximal sternites. Interocular bar blackish. Caudal tibiae proportionately shorter, decidedly inflated; distal portion of caudal tibiae heavily infusate. [Cuba.]

12. Size large. Surface punctulate. Color solidly blackish fuscous, or with ochraceous lateral borders to thoracic segments and tegmina. 13.

Size medium. Surface smooth, moderately polished, finely punctulate solely on tegmina. Head, pronotum, tegmina and thoracic segments with pale base color; face transversely dark barred, pronotum with fuscous horseshoe-shaped figure on disk. Abdomen fuscous, proximal tergites pale proximolaterad. [Antigua.]

13. Form less robust in both sexes. Tegmina proportionately more abbreviate and transverse. Caudo-lateral angles of seventh abdominal tergite with spiniform production lacking marked internal lamellation. Supra-anal plate of male of type usual in genus. Caudal tibiae relatively shorter. Pronotal, tegminal, and abdominal punctulations and sculpture less decided in male sex. [Cuba.]

similis Caudell.

13. Form more robust in both sexes. Tegmina proportionately longer and less strongly transverse. Caudo-lateral angles of seventh abdominal tergite with spiniform production having an arcuate lamellation on internal face. Supra-anal plate of male transverse, with caudo-lateral angles produced laterad into recurved cornuiform spines, whole plate sharply upcurved distad. Caudal tibiae relatively longer. Pronotal, tegminal, and abdominal punctulations and sculpture more decided, semi-shagreenous in male sex. [Cuba.]

taurus, new species.

14. Color blackish or blackish fuscous, tegmina not contrasted. Size larger (body of female, 29 mm. long). [Hispaniola.]

tibialis Hebard.

Color blackish, tegmina ochraceous with all of the margins narrowly blackish. Size smaller (body of female, 20.5 mm. long). [Cuba.]

avipennis Saussure and Zehntner.

In addition to the above species we would assign, tentatively to this genus, *Blatta guttata* Thunberg, described from St. Bartholomew, on the basis of a female.¹

***Eurycotis lacernata* Cabrera**

Plate XII, Figures 6 and 7

Eurycotis fischeriana (err. for *finschiana*) REHN (not of Saussure), 1903, Trans. Amer. Entom. Soc., XXIX, p. 278. (In part.) San Diego de los Baños, Pinar del Rio, Cuba.

Eurycotis finschiana REHN (not of Saussure), 1909, Second Rep. Centr. Exper. Stat. Cuba, p. 185. (In part.) San Diego de los Baños, Pinar del Rio, Cuba.

Eurycotis lacernata CABRERA, 1922, Mem. Soc. Cub. Hist. Nat. "Felipe Poey," IV, p. 94. Camoa, Havana Province, Cuba.

By an unfortunate misunderstanding Señor José Cabrera, who collected a portion of the material of the species now before us, very recently published the manuscript names *E. lacernata* and *balteata* supplied to him by us, together with descriptions of the more striking color features of the species.

The original author of this species has placed in our hands, for the collection of the Academy of Natural Sciences of Philadelphia, the typical series of both of these species. The names as used by Señor Cabrera are perfectly valid and must be credited to him, as no part of the description was written by either of the present authors. We are permitting our detailed description of the figured allotypic female, which was prepared before the name was published, to appear, as originally drawn. We have selected as single type a male of the original lot sent by Señor Cabrera, and have given its essential differences from the description of the female.

This is probably the most strikingly distinctive of the smooth species of the genus, its solidly bicolored pattern readily separating it from all others we have seen. The diagnostic features are given in the key.

¹The description of this species (1810, Kongl. Vet.-Akad. Handl., XXXI, p. 188) is not adequate to place the form, but it is probably a *Pelmatosilpha* or a *Eurycotis*, and we incline toward the latter assignment, as the mention of tegmina and reference to the specimen as an immature female show those organs were probably reduced and laterad, and clearly not as elongate as in *Pelmatosilpha*. From this the specimen was probably an adult female. The abdominal segments are said to be maculate with flavescent, as is the case with the caudal angles of the pronotum and tegmina, while the size was given as about that of *Blatta orientalis*. We have nothing that we can with certainty place under Thunberg's name, which probably represents a distinct species from those here treated. Shelford (1908, Trans. Entom. Soc. London, p. 467) has given the present position of the name as that of a synonym of *Rhyparobia maderæ* (*Leucophæa maderæ* of the present authors), on the immature form of which species he considered *guttata* was based. In appreciation of Mr. Shelford's discernment we would conclude that, from such an assignment, he did not see Thunberg's original specimen. The original description of its surface as "glabra, lævis" could by no possible stretch of the imagination fit the immature of the species to which he assigned it. The original individual of *guttata* probably has been misplaced or lost, in the intervening years, and a substitution made, which was not checked from the description by Shelford. As Rehn has shown elsewhere (Proc. Acad. Nat. Sci. Phila., 1918, p. 145, footnote 3) it is quite evident Shelford did not see the original material of DeGeer's *Blatta minutissima* in his study of the DeGeerian collections, a specimen of *Holocompsa* having been associated with that name, while the original description, as well as the figure of DeGeer's insect, demonstrates that an *Anaplecta* of the *lateralis* type was before the older author.

DESCRIPTION OF ALLOTYPIC FEMALE.—Cotorro, Havana Province, Cuba. February, 11, 1919. (José Cabrera.) [Academy of Natural Sciences of Philadelphia.]

Size medium; form distinctly depressed, subelliptical in outline; surface glabrous, distinctly polished on the dark areas of the body.

Head very broad, nearly as broad as deep, almost completely hidden under pronotum; occiput well and regularly arcuate between eyes; interocular space very broad, very slightly greater than that between antennal scrobes; eyes not prominent, not extending ventro-caudad of the ventral margin of the antennal scrobes. Palpi relatively slender; fourth joint appreciably shorter than third, infundibuliform; fifth joint subequal to third in length, slightly arcuate, narrowing in profile from proximal third, apex blunt acute. Antennæ distinctly surpassing body in length, setaceous, proximal joint moderately inflated.

Pronotum short semi-ovate, greatest length contained one and one-half times in greatest caudal width: cephalic margin over head rather narrowly arcuate-truncate; caudal margin truncate, very slightly convex laterad to the narrowly rounded rect-angulate caudo-lateral angles; lateral margins regularly arcuate divergent caudad, all margins very finely cingulate: surface virtually without impressions, whole pronotum in transverse section regularly arcuate.

Tegmina reaching and but faintly surpassing distal margin of mesonotum, lateral, separated by about one and one-half times proximal width of tegmen, this proximal width subequal to their length; costal margin nearly straight, markedly cingulate, disto-caudal angle broadly rounded, the tegmina regularly narrowing distad by arcuation of the sutural margin. Mesonotum truncate caudad. Metanotum with its caudal margin obscurely biarcuate, median blunt angulation weak; laterad the segment is distinctly cingulate, rectangulate caudo-laterad.

Abdomen with tergites narrowly but distinctly cingulate laterad, caudo-lateral angles becoming progressively acute or spiniform distad, being distinctly spiniform produced on the two distal normally exposed segments. Supra-anal plate subtrigonal, slightly transverse, moderately tectate, not carinate dorsad, lateral margins weakly sigmoid, regularly convergent distad, apex rather broadly but very decidedly V-emarginate. Cerci but little surpassing apex of supra-anal plate, broad, depressed dorsad, fusiform, the apex slightly attenuate, acute. Subgenital plate of moderate size, more deplanate than usual in subfamily, distal margin of valves forming an obtuse angle.

Limbs moderately robust. Cephalic femora with ventro-cephalic margin having a regular series of spines, distal large spines of this margin three in number, increasing in length distad. Caudal tibiae appreciably longer than femora, slender proximad, inflated when seen in both aspects, surface largely pitted and pocked; extensor surface broad, poorly defined, without marginal carinae: caudal tarsi two-thirds as long as caudal tibiae, subcompressed; metatarsus subequal in length to remaining tarsal joints, pulvillus apical.

SELECTED TYPE.—Male; Camoa, Havana Province, Cuba. June 10, 1921. (José Cabrera.) [Academy of Natural Sciences of Philadelphia, Type No. 5387.]

The features of the male sex here given are those of difference from the above description of the female allotype.

Size relatively small (for genus). Pronotum with greatest length contained slightly less than one and one-half times in greatest caudal width; caudal margin more completely truncate.

Supra-anal plate transverse, subtrapezoidal, distal margin bilobate, with obtusely angulate median emargination. Cerci damaged. Subgenital plate short, strongly transverse, stylar fossæ distinctly lateral in position, dextral relatively shallow, sinistral much more extensive, distal margin between stylar fossæ moderately but unsymmetrically arcuate; styles relatively long, slender, tapering, appreciably in-curved, particularly distad.

General color of dorsal surface shining warm brownish black, margined laterad by relatively broad bars, varying in different individuals from pale zinc orange to light cadmium, these bars narrowing cephalad on lateral portions of pronotum and very narrowly failing to meet dorsad of head, approximately subequal in width from caudal margin of pronotum to middle of sixth¹ abdominal tergite, where the bars stop abruptly, their width at the tegmina being approximately subequal to that of latter, but the very narrowest proximal portion of the sutural margin of which is dark. Dark pronotal disk rather horseshoe-shaped in peripheral outline; lateral cingulate margins of the thoracic segments and abdomen and costal margin of tegmina very finely pencilled with dark. Head, ventral surface of thoracic segments and limbs dull light cadmium to antimony yellow, with the following excep-tions: face with a reversed trigonal to heavy T-shaped marking of the dark dorsal color, which involves a broad interocular bar, a thick vertical shaft, narrowing ventrad, and a much weaker, connected lining of the facio-clypeal suture; infra-ocular lateral margins of face with or without infusate maculations; median and caudal coxæ with several infusate lines; femora with dorsal margin lineate with mars brown; caudal tibiæ and tarsi russet to mars brown, the distal tarsal joint generally paler (degree variable). Venter of abdomen and subgenital plate ranging individually from chestnut to nearly as deep as the dorsal dark color, with lateral pale borders complementary to those of dorsal surface in distribution and color, but slightly narrower and less sharply defined mesad; lateral portions of distal abdominal sternite proportionately darker than remainder of venter. Antennæ ochraceous-tawny to prout's brown. Eyes ranging from the dark dorsal color through clove brown to hair brown.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Length of Caudal Tibia
♂, Camoa, Cuba, type.	20.2	6	8	3.1	7.2mm.
♂, Camoa, Cuba, para- type.....	19.6	6.3	8.8	3.5	7.5
♀, Cotorro, Cuba, allo- type.....	24	7	9.9	4.1	8.9
♀, Camoa, Cuba, para- type.....	21.8	6.2	9	3.8	8
♀, San Diego de los Baños, Cuba.....	21	6.5	9.4	3.6	8.2
♀, "Cuba,".....	24.2	6.6	9.3	4.2	8.4

¹Counting median segment as tergite one.

In addition to the female allotype and the selected single type described above, we have before us a paratypic male and female, as well as an immature male, from Camoa, with the same data as the type, now in the collection of the Academy of Natural Sciences; a female from San Diego de los Baños, Pinar del Rio Province, Cuba, taken April 22, 1900, by Palmer and Riley, and in the collection of the United States National Museum; a female labelled simply, "Cuba, Ch. Wright," in the collection of the Museum of Comparative Zoölogy. The "Cuba" specimen is appreciably paler than the others, but the color range is slight, and the species is a most striking and easily recognized one.

The San Diego de los Baños individual previously had been reported in error by Rehn as "*E. fischeriana*," a typographical error for *finschiana*. At that time Rehn failed to distinguish the species here described as *lacernata*, *torquinensis* and *balteata*, but of the specimens then available that belonging to *balteata* was immature, that of *torquinensis* a male, that of *lacernata* a female. Additional material now available demonstrates the composite character of his reference, while *finschiana* is seen to be a synonym of *E. opaca*.

In the six adult specimens available we find the number of spines on the ventro-caudal margin of the cephalic femora varies from five distal and median, through three distal and one median spine to two distal and no median spines.

This species may be restricted to western Cuba.

Eurycotis bahamensis¹Rehn

Plate XII, Figure 8

Eurycotis bahamensis REHN, 1906, Bull. Amer. Nat. Hist., XXII, p. 110, Fig. 10. ♂, ♀; Fish Hawk Key, Andros Island, Bahamas; Little Golding Key, Andros Island, Bahamas.

BAHAMAS.—Mangrove Key, 1904, (O. Bryant), 1 ♂, 1 ♀, [Hebard Cln.]. Eleuthera Island, April 11 to 20, 1897, (C. J. Maynard), 1 immature ♀, 1 very small immature individual, [M. C. Z.].

The material recorded from Mangrove Key, Bahamas, by Morse as *Eurycotis* species indet.,¹ we now know to be the present species, as suggested by Rehn.² The above recorded pair of this species in the Hebard Collection formed part of the series examined by Morse.

This species is in one feature the most distinctive of the West Indian forms of the genus. The metatarsal pulvillus of the caudal tarsi are

¹1905, Psyche, XII, p. 19.

²1900, Bull. Amer. Mus. Nat. Hist., XXII, p. 110.

far more elongate than in any of the other forms examined, being equal to distinctly more than one-half of the metatarsal length. The immature female from Eleuthera is in the instar preceding maturity, but the elongation of this pulvillus is there evident, although much less decided than in the adults. The very small Eleuthera individual has lost the caudal tarsi.

In coloration the Mangrove Key adults show no noteworthy differences from the original description and figure. The median and cephalic tibiae, however, are in part very distinctly paler than the caudal tibiae, although all are infuscate to a degree distad and along the margins. The immature specimens have the tibiae more uniformly infuscate. The Eleuthera female in the instar preceding maturity had the thoracic markings virtually as figured, except that the prothoracic markings are united cephalo-mesad, a condition closely approached in the Mangrove Key male. The abdomen in this immature female shows weak transverse pale bars on the three proximal tergites. The very small Eleuthera immature specimen (9.2 mm. long) has the head dorsad of the inter-antennal bar solidly infuscate; the pronotal disk with a large transverse, subelliptical median blotch, a narrow cephalic, broadening lateral and narrow caudal margins pale, the immediate caudal margin of the segment narrowly darkened; meso- and metanotum mesad largely dark, with poorly defined lateral pale borders; abdomen solidly blackish fuscous dorsad and ventrad.

Eurycotis torquinensis, new species

{ Plate XII, Figures 9 to 12.

Eurycotis fischeriana (err. for *finschiana*) REHN (not of Saussure), 1903, Trans. Amer. Entom. Soc., XXIX, p. 278. (In part.) Torquino Peak, Cuba.

Eurycotis finschiana REHN (not of Saussure), 1909, Second Rep. Centr. Exper. Station Cuba, p. 185. (In part.) Torquino Peak, Cuba.

The small size, variegated pattern, characteristic face marking and bilobate male supra-anal plate, combined with subquadrate tegmina, will serve to differentiate this very distinct species. It is probably a montane form of localized distribution, not being represented in the series taken in the Monte Toro and Monte Libano region near Guantanamo. We have discussed under *E. lacernata* our previous reference of that species to *fischeriana* (err. for *finschiana*).

TYPE.—Male; Torquino Peak, Sierra Maestra, Oriente Province, Cuba. Elevation, 5900 feet. April, 1912. (S. Harbert Hamilton.) [Academy of Natural Sciences of Philadelphia, Type No. 5361.]

Size small (for the genus); form moderately depressed, elongate elliptical; surface moderately shining, obscurely impresso-punctulate on tegmina and distad on abdomen.

Head almost completely hidden under pronotum; broad, with face moderately deplanate; occiput moderately arcuate, eyes not prominent: interspace between eyes appreciably greater than that between antennal scrobes. Antennæ in length surpassing body, being half again as long as latter, setaceous; proximal joint moderately enlarged. Palpi essentially as in *lacernata*.

Pronotum of general type found in *lacernata*, but cephalic margin more arcuate and hardly at all truncate, caudal margin gently arcuate throughout, caudo-lateral angles more broadly rounded.

Tegmina short, lateral, subquadrate, in length slightly surpassing distal margin of metanotum, and then only by the disto-costal extremity, separated from one another by nearly the width of a single tegmen, proximal width of tegmen slightly greater than costal length: costal margin weakly arcuate, very appreciably cingulate; disto-costal angle well rounded rectangulate; distal margin sub-oblique, nearly transverse, almost imperceptibly concave; disto-sutural angle rounded obtuse; sutural margin weakly arcuate. Mesonotum with distal margin truncate. Metanotum subequal in width mesad and laterad; lateral margins distinctly cingulate, caudo-lateral angles sharply rectangulate; caudal margins subtruncate, with a faint median projection.

Abdomen with tergites produced, spined and cingulate laterad as in *lacernata*. Supra-anal plate of male transverse, bilobate, from lateral cercal emarginations the margins regularly narrow to the distinct paired lobulations, median emargination broadly obtuse-angulate, moderately deep, distal portion proper with sparse, elongate, chaetiform hairs; dorsal surface of male supra-anal plate not tectate, shallowly subexcavate laterad. Cerci approximately twice as long as supra-anal plate, attenuate fusiform, broad, depressed dorsad. Subgenital plate transverse, arcuate subtruncate between styles, which are inserted in relatively large sockets; styles but little shorter than the segment, slender, tapering, very faintly incurved, apex blunt. Concealed genitalia: sinistral hook with its apex recurved, moderately enlarged, its distal margin subtruncate, the two angles bluntly produced yet rounded; dextral spine broad, lamellate, distad developed into a slightly recurved, moderately heavy, spiniform hook.

Limbs moderately robust. Cephalic femora having series of nine spines on distal two-thirds of ventro-cephalic margin, distal group of spines three, increasing in length distad; ventro-caudal margin of cephalic femora with three spines on distal third. Median tibiæ moderately expanded. Caudal tibiæ in length slightly surpassing caudal femora, moderately inflated, narrowed proximad, moderately deplanate; extensor surface narrow, flattened, its bounding margins largely acute: caudal tarsi moderately compressed, with metatarsus faintly shorter than remainder of tarsus, pulvillus apical.

General base color mustard yellow to pale chamois, becoming isabella color on third to seventh abdominal tergites and mesad on the proximal sternites. Dark pattern blackish fuscous; abdominal tergites very narrowly lined on their caudal margins, and thoracic segments with a narrow intermarginal wash on same margin, claret brown. Head with a sharply contrasted interocular and facial dark marking, which in shape is a broad isosceles triangle, apex ventrad, base interocular, reaching from eye to eye; clypeal suture with a distinct, transverse infuscation; ocellar region

with paired reniform blotches of fuscous; antennæ buckthorn brown proximad, gradually passing into fuscous distad; eyes cinnamon-brown. Pronotum with a pair of longitudinal, well-separated, subparallel, lanceolate dark markings, which are acute caudad, rounded cephalad; cingulate margins pencilled with fuscous, very obscurely so caudad. Tegmina with sutural half fuscous, pale to claret brown disto-suturad, this sharply contrasted with pale costal half; cingulate costal margin lined with ochraceous-tawny; mesonotum mesad with faint rufescent pattern. Metanotum with lateral cingulate borders lined similarly to costal margin of tegmina; in the relative position of articulation of the wings, and as a component of the longitudinal pattern, is placed an ovate dark spot, half as long as segment. Abdomen with proximal tergites washed ratherly obscurely with claret brown; dark transverse bars of proximal tergites failing to reach lateral margins of the segments; lateral cingulate margins of tergites finely pencilled with rufescent: apex of abdomen from and including distal portion of sixth tergite blackish fuscous, supra-anal plate in part obscurely rufescent, subgenital plate chestnut; fifth abdominal sternite narrowly ochraceous laterad. Limbs not markedly infusate except at spine insertions and margins of extensor surface of caudal tibiæ; caudal tarsi passing to dull orange-ochraceous.

Length of body, 19.2 mm.; length of pronotum, 6.2; greatest width of pronotum, 7.7; length of tegmen, 3.2; proximal width of tegmen, 3.5; length of caudal tibia, 7.

This most interesting and distinctive species is known only from the type.

Eurycotis balteata Cabrera

Plates XII, Figures 13 and 14; XIII, Figure 1

Eurycotis fischeriana (err. for *finschiana*) REHN (not of Saussure), 1903, Trans. Amer. Entom. Soc., XXIX, p. 278. (In part.) San Diego de los Baños, Pinar del Rio Province, Cuba.

Eurycotis finschiana REHN (not of Saussure), 1909, Second Rep. Cent. Exper. Station Cuba, p. 185. (In part.) San Diego de los Baños, Pinar del Rio Province, Cuba.

Eurycotis balteata CABRERA, 1922, Mem. Soc. Cuban. Hist. Nat. "Felipe Poey," IV, p. 94. Camoa, Havana Province, Cuba.

For comments on the publication of this name by Cabrera, see above under *E. lacernata*. As Cabrera's diagnosis is solely of the more evident color features, we are giving a detailed description of structural and color characters.

Señor Cabrera has placed in our hands the original material upon which the name *balteata* was based, from which we select the type and allotype here indicated.

The present species is very close to *ferrum-equinum*, described below, but it can be distinguished by the infusate caudal tibiæ, the solidly dark dorsal apex of the abdomen and the complete character of the transverse dark linings of the proximal abdominal tergites, the broadly bilobate instead of broadly emarginato-truncate distal margin of the

supra-anal plate, and certain other less evident features, such as the broader extensor face of the caudal tibiae, and the spectacle-like character of the pronotal dark markings.

SELECTED TYPE.—Male; Camoa, Havana Province, Cuba. June 16, 1921. (José Cabrera.) [Academy of Natural Sciences of Philadelphia, Type No. 5388.]

DESCRIPTION OF MALE.¹—Cotorro, Havana Province, Cuba. February 11, 1919. (José Cabrera.) [Academy of Natural Sciences of Philadelphia.]

Size relatively small (for the genus); form ovate, broad, abdomen broader than thorax, depressed; surface smooth, weakly shining, particularly on dark areas.

Head almost completely hidden under pronotum, broad, its greatest width across eyes slightly greater than its greatest depth: occipital outline weakly arcuate; interocular spaces very broad, appreciably broader than the width between antennal scrobes. Palpi as described in *E. lacernata*. Antennae at least as long as the body (apex incomplete in material before us). Eyes little prominent.

Pronotum with its greatest length contained nearly one and two-fifths times in greatest caudal width, semi-orbicular: cephalic margin relatively narrow, weakly arcuate, regularly passing into the caudad divergent lateral margins, which are arcuate; ventro-caudal angles narrowly rounded rectangulate; caudal margin truncate; all margins narrowly cingulate: in transverse section the pronotum is arcuate, latero-cephalad with a subcuclulate tendency.

Tegmina lateral, separated by nearly twice the width of a single tegmen, lobi-form, narrowing distad, with a weak subquadrate tendency, proximal width slightly greater than the length; costal margin cingulate, nearly straight, distad strongly arcuate to the arcuate distal margin, which is subtransverse; sutural margin oblique truncate, disto-sutural angle obtuse, evident; surface of tegmina punctulate; apex of tegmina not surpassing mesonotal distal margin. Mesonotum with distal margin truncate. Metanotum with caudal margin very weakly biconcave, median point weak but evident.

Abdomen with lateral margins of tergites cingulate, caudo-lateral angles of same progressively more acute to spiniform distad. Supra-anal plate transverse, its distal margin broadly bilobate, very weakly subtectate mesad, surface faintly subexcavate laterad. Cerci about twice as long as supra-anal plate, relatively heavy, fusiform, depressed dorsad. Subgenital plate and styles of the type found in *E. torquinensis*. Concealed genitalia; dextral spine much as in *torquinensis*, but tapering more gradually from lamellate proximal portion to spiniform distal section, lamellate portion also less expanded.

Limbs robust. Caudal tibiae markedly inflated, narrowing proximad, appreciably depressed, surface punctate; extensor surface with its bounding margins distinct but non-carinate; caudal tarsi three-fourths as long as caudal tibiae, moderately compressed; metatarsus slightly shorter than combined length of other tarsal joints, pulvillus occupying one-fourth of metatarsal length.

ALLOTYPE.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

¹The condition of the type is by no means as good as is that of a male from Cotorro, Cuba, sent to us some years ago by Señor Cabrera, and which formed the basis of our recognition of the species. This specimen, we had figured before Cabrera described the species, and we feel fully warranted in permitting our original description of this male to stand unaltered.

The features given below are those of noteworthy difference from the description of the male given above.

Supra-anal plate subtriangular, apex as seen from dorsum moderately concave, seen in caudal aspect narrowly rounded rectangulate-emarginate; in transverse section plate is distinctly tectate. Cerci as in male but, due to greater production of supra-anal plate, the proportion in relation to that plate is much less, the cercal apices surpassing that of supra-anal plate by approximately one-third of the length of plate. Subgenital plate as usual in female of genus, relatively small, not extending laterad beyond infra-cercal region.

General base coloration of head, thoracic segments and dorso-proximal portion of abdomen, antimony yellow; overlying dark pattern of dorsum and occiput, warm blackish fuscous, the distribution of this pattern as here given. Head with a relatively broad, solid, dark interocular bar; antennæ brickred; eyes deep mummy brown. Pronotum with a paired dark distal pattern, made up of lateral lanceolate blotches, somewhat oblique in their disposition, connected cephalad by a bar subequal in width to the occipital interocular bar, the whole somewhat spectacle-shaped; caudal margin of pronotum between the points dorsad of the normal articulation of the tegmina broadly dark margined, this faintly narrowing mesad; pronotal margins elsewhere finely margined with blackish, this wider laterad. Mesonotum and metanotum with their caudal margins marked similarly to that of the pronotum, remainder of the caudal and lateral margins finely margined with blackish; metanotum with a dark spot on each side in the usual position of the wing articulation. Tegmina with costal margin distinctly lined with dark, distal and sutural margins similarly pencilled with chestnut-brown. Abdomen with the sixth and subsequent abdominal tergites, to and including supra-anal plate, solidly dark; proximal tergites completely transverse barred on their distal margin with dark, the bars equal in width and continued to and confluent with the narrow dark lateral pencilling of the tergites; cerci and supra-anal plate tending toward liver brown; venter of abdomen solidly dark, passing from dark liver brown proximad to liver brown on the subgenital plate, except that the five proximal sternites have lateral ocelliform antimony yellow spots; styles liver brown, becoming blackish at apex. Limbs of the pale general color with spines liver brown, except that the caudal tibiae and tarsi, exclusive of distal joint and claws, are solidly liver brown, becoming more blackish fuscous on the second, third and fourth tarsal joints, fifth joint and claws dull zinc orange.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum
♂, Camoa, Cuba, type.....	21.3	6.5	8.8
♂, Cotorro, Cuba.....	19.2	6.5	9.4
♀, Camoa, Cuba, allotype.....	22.8	6.6	8.5

	Length of Tegmen	Proximal Width of Tegmen	Length of Caudal Tibia
♂, Camoa, Cuba, type.....	3.7	3.1	7.8mm.
♂, Cotorro, Cuba.....	3.4	3.2	8.
♀, Camoa, Cuba, allotype.....	3.8	3.2	8.3

In addition to the type, the described male and allotype, we have before us an immature male and an immature female, bearing the same data as the type and allotype, also an immature female from San Diego de los Baños, Pinar del Rio Province, Cuba, taken April 22, 1900, by Palmer and Riley,¹ from the collection of the United States National Museum. The adults are quite uniform in coloration, but the three immature individuals show appreciable variation. That from San Diego de los Baños is essentially as described for the adults, except that the caudal tibiae and tarsi are paler, more hay's russet, the spines of all the limbs more cinnamon brown to buckthorn brown. Those from Camoa, however, have the paired pronotal marking more extensive caudad, laterad reaching and fusing with the dark caudal margin of the pronotum. Lateral dark patches on the other thoracic segments, in continuation of the pronotal markings, are well indicated, the transverse abdominal barring is somewhat heavier, and the tibial coloration is as noted in the San Diego de los Baños specimen.

This species may prove to be restricted to western Cuba.

***Eurycotis ferrum-equinum*,² new species**

Plate XIII, Figures 2 to 5

This species is closely related to *E. balteata*, with which it has been compared in the diagnosis of the latter on a preceding page. The absence of a solidly dark apex to the abdomen, the lateral evanescence of the transverse lining of the proximal abdominal tergites, the pale caudal tibiae and the shape of the dark pronotal marking will serve to distinguish *ferrum-equinum* from *balteata*, while the maculate pronotum will immediately distinguish it from those species which follow in the sequence here adopted.

TYPE.—Male; La Union, Monte Libano, Oriente Province, Cuba. May 18, 1913. (C. T. Ramsden; under stones in woods.) [Academy of Natural Sciences of Philadelphia, Type No. 5363.]

Size relatively small (for the genus); form elliptical, abdomen slightly broader than thorax; surface moderately shining, particularly that of dorsal surface.

Head little evident cephalad of pronotum, its greatest width across eyes subequal to the depth of head: occiput and eyes regularly arcuate in outline; interocular width appreciably greater than that between antennal scrobes. Eyes not prominent. Palpi as in the species described above. Antennae surpassing body in length.

Pronotum semi-orbicular, with its greatest length contained one and one-half times in its greatest caudal width; cephalic margin arcuato-truncate, passing into the

¹This specimen Rehn has already reported as *E. fischeriana* (err. for *finschiana*). For reference see above and under *E. lacernata*.

²In allusion to the horseshoe-shaped pronotal marking.

broadly arcuate lateral margins; caudal margin truncate in median three-fifths, laterad weakly oblique to the latero-caudal angles, which are nearly rectangulate, but slightly more obtuse; entire margins finely cingulate: in transverse section pronotum is regularly arcuate, weakly sub-cucullate over eyes.

Tegmina lateral, broad lobiform, their proximal width slightly less than their length, their apices very faintly surpassing caudal margin of mesonotum, sutural margins separated by a space equal to one and one-half times the width of a single tegmen; costal margin arcuate and weakly flattened in outline; sutural margin regularly arcuate, approaching costal margin to the well-rounded apex; costal margin distinctly cingulate. Mesonotum with distal margin truncate. Metanotum longer laterad than mesad, caudal margin broadly but weakly biconcave, median projection separating the concavities slight; caudo-lateral angles rectangulate; lateral margins flattened arcuate, cingulate.

Abdomen with lateral margins of sternites having caudal angles, progressively distad, acute to spiniform produced, cingulate. Supra-anal plate moderately transverse; lateral margins converging distad; distal margin broad, very shallowly and broadly obtuse-angulate emarginate, supplied with long, spaced bristles, disto-lateral angles markedly developed, obtuse-angulate; surface of plate moderately impressed latero-distad. Cerci nearly twice as long as supra-anal plate, heavy, broad, fusiform, depressed dorsad, immediate apex moderately acute. Subgenital plate as in species described above: styles elongate, slender, tapering, faintly incurved, apex not blunted.

Limbs robust. Cephalic femora with nine spines distributed over distal two-thirds of ventro-cephalic margin, the distal group three in number, increasing in length distad; ventro-caudal margin of cephalic femora with three spines on its distal portion. Caudal tibiæ somewhat longer than the femora, appreciably inflated, narrowed at proximal extremity, distinctly depressed, surface of caudal tibiæ cribroso-punctulate; extensor surface narrow, margins limiting the same evident, in part carinate. Caudal tarsi three-fourths as long as caudal tibiæ, compressed; metatarsus subequal in length to remaining tarsal joints, pulvillus of metatarsus covering distal fourth of ventral surface.

ALLOTYPE.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

Differs from the description of the male type in the following features.

Size slightly larger. Supra-anal plate moderately produced, lateral margins weakly sigmoid, converging distad; distal margin broadly, relatively deeply and regularly arcuate-emarginate, lateral angles faintly acute; surface of supra-anal plate faintly impressed in vicinity of lateral angles and at bottom of distal emargination, elsewhere regularly arcuate transversely. Cerci one and one-third times as long as supra-anal plate, faintly more attenuate than in male. Subgenital plate not markedly prominent, distal margin arcuate-obtuse-angulate, in profile with distal extremity narrowly subtruncate.

General base coloration ochraceous-buff, ventrad with a slight light ochraceous-salmon tendency on the coxæ, median section of dorsum of thoracic segments (allotypic female and one immature individual), and occasionally the abdominal sternites (one immature), weakly rufous. Dark pattern blackish fuscous, distributed as here described. Head with a decided dark interocular bar, which is generally quite wide, but varies, being appreciably narrower in the type than in other specimens; antennæ

tawny to cinnamon brown, passing into fuscous or mummy brown distad; eyes fuscous to hair brown. Pronotum with the black pattern decided, prominent, horseshoe-shaped, the sides very rarely (in paratypic female) narrowly separated cephalad by a fine pale line; median pale area, within the horseshoe, roughly trilobate to more distinctly triangular, bearing in the males a semicircular series of fine dark points cephalad, these occasionally incomplete mesad (in a paratypic female), complete in the type, a caudal pair of similar points indicated in both sexes, the horseshoe-shaped pattern in adults not fully connected with the broad blackish caudal margin of the pronotum, the latter not reaching the caudo-lateral angles, its median width less than that over the normal points of tegminal articulation: entire cingulate margin of the pronotum narrowly dark, slightly more broadly so laterad. Tegmina uniformly pale, except for the russet pencilling of the costal margin. Mesonotum and metanotum with the caudal margins marked with dark similarly to that of the pronotum, the lateral depth of the markings greater, their failure to reach the lateral borders similar; disk of both segments with a few transversely disposed fine points of fuscous; lateral margins of metanotum pencilled with russet. Abdomen with the transverse bars indicated on all tergites, conspicuously made up of one element proximad on one tergite and another distad on the preceding tergite, the bars narrowing laterad and failing to reach the lateral margins, latter pencilled with russet to mars brown; in the broadly exposed ultimate tergite the fuscous largely monopolizes the segment, the pale color being restricted to transversely disposed spots of pale orange-rufous; supra-anal plate in both sexes blackish fuscous proximad and with a median gradually narrowing spur extending caudad, this dividing the pale portion into two large lateral areas; venter of abdomen with the dark area varying from one extreme, where the greater portion is blackish fuscous, except for pale lateral borders and median transverse dashes of pale on the proximal sternites (type), to another where the dark area is virtually restricted to the subgenital plate, median portion of the ultimate and meso-caudal portion of the penultimate abdominal sternites (paratypic female). Cerci burnt sienna to mahogany red, distad passing to ochraceous. Limbs with spines rufous to fuscous, frequently russet tipped with fuscous; caudal tibiae variably, but always rather weakly, washed with russet, this more evident nearer the flexor surface.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum
♂, type.....	20.2	6.4	9
♀, paratype.....	23.6	7	9.6
♀, allotype.....	22.9	6.5	9

	Length of Tegmen	Greatest Width of Tegmen	Length of Caudal Tibia
♂, type.....	3.7	3.2	7.4 mm.
♀, paratype.....	4.4	3.3	8.5
♀, allotype.....	3.4	3.2	8.4

In addition to the type and allotype we have before us a paratypic female, bearing the same data as the type; two immature females with similar data, and one small immature specimen from Baracoa, Cuba, taken April, 1915, and from the collection of Mr. W. T. Davis. The La Union specimens are all in the collection of the Academy of Natural Sciences of Philadelphia. The paratypic female shows no noteworthy differences from the descriptions, but in the general coloration of the dorsum is more like the male type than the female allotype, while ventrad it is more like the allotype. The two immature females are in the instar preceding maturity, with their general pattern much as in the adults, but having regular continuous extensions of the pronotal horse-shoe-shaped marking extending over the meso- and metanota, the pale lateral portions of the same segments as sharply contrasted as the lateral portions of the pronotum, the dark extensions connected with the blackish fuscous caudal margins of the same segments. In one immature specimen there is a tendency toward a continuation of these bars upon the abdomen, in conjunction with the transverse dark barring of the tergites of the same, while in addition there is a weak indication of a median longitudinal dark bar on the same tergites. The specimen mentioned above is the only individual seen by us showing closely the superimposing of a longitudinal dark pattern upon a transverse dark pattern on the abdominal tergites.

The very young specimen from Baracoa is interesting in that it has the pronotal disk virtually solid dark and the median sections of the mesonotum and metanotum infuscate to a considerable degree. It would appear from this that the bilineate type of coloration is not a primitive type. This conclusion is supported, in a measure, by the quite immature specimen of *E. bahamensis* mentioned above. In all the immature specimens the venter of the abdomen is solidly dark, except for the pale lateral margins.

The spination of the ventro-cephalic margin of the cephalic femora varies from ten to eleven in number, this variation found on the two limbs of the female paratype, while the ventro-caudal margin of the same femora has the spines varying from two to four, the paratypic female having two on one limb and three on the other, four being found on the single remaining cephalic femur of one of the La Union immature females.

The species is probably restricted to eastern Cuba.

Eurycotis galeoides,¹ new species

Plate XIII, Figures 6 and 7

Of the non-maculate pronotum group of species the present one can be distinguished from the others by all the abdominal sternites being barred and the abdomen without a large dark apical section, while the supra-anal plate of both sexes is part-colored. From *scalaris* it also can be distinguished by the broadly bilobate supra-anal plate of the male, and from *dimidiata* and *scalaris* in addition by the broadly subquadrate tegmina, while from *caraíbea* it can be separated by the much narrower, very well separated and distinctly lateral tegmina.

TYPE.—Male; La Union, Monte Libano, Oriente Province, Cuba. March 23, 1913. (C. T. Ramsden; under stones in deep woods.) [Academy of Natural Sciences of Philadelphia, Type No. 5364.]

Size relative small (for the genus); form ovate, considerably depressed; surface moderately polished.

Head almost entirely hidden under pronotum when seen from dorsum; occiput, with dorsal portion of eyes, regularly arcuate; interspace between eyes very broad, appreciably wider than area between antennal scrobes. Palpi of type found in other species of genus but more slender than usual. Antennæ at least half again as long as body. Pronotum semiorbicular, of type usual in genus, greatest length contained one and one-third times in greatest caudal width of same; cephalic margin of pronotum truncato-arcuate cephalad, passing regularly into the lateral margins, which are arcuate, almost imperceptibly flattened cephalad; caudal margin truncate, laterad slightly obliquely rounded to the rather narrowly rounded rectangulate latero-caudal angles; disk in transverse section regularly arcuate, latero-cephalic portion narrowly subcucullate; entire margin finely cingulate.

Tegmina lateral, lobiform, but faintly surpassing caudal margin of mesonotum, separated mesad by an interspace subequal to proximal width of single tegmen, greatest length and proximal width of tegmen subequal, outline faintly subquadrate; costal margin weakly arcuate, straighter proximad, disto-caudal angle well rounded rectangulate; sutural margin oblique arcuato-truncate, disto-sutural angle very faint, rounded obtuse; distal margin oblique arcuato-truncate, rounding to both bounding angles; costal margin cingulate. Mesonotum with caudal margin truncate. Metanotum slightly longer laterad than mesad; caudal margin, except for short truncate sections laterad, broadly and shallowly, but distinctly, concave, with a slight median projection; lateral margins of metanotum weakly arcuate, cingulate, caudo-lateral angles rectangulate.

Abdomen with lateral margins cingulate and caudo-lateral angles developed as usual in genus. Supra-anal plate transverse, distal margin bilobate, the lobes somewhat flattened, median emargination very broadly and shallowly V-shaped, distal margin with a row of distinct setæ; dorsal surface of supra-anal plate faintly tectate disto-mesad, laterad broadly subdepressed. Cerci slightly more than twice as long as supra-anal plate, fusiform, tapering in distal half, deplanate dorsad. Subgenital plate of type usual in genus; styles elongate, tapering, faintly incurved, apices slightly blunted.

Limbs moderately robust. Cephalic femora with ventro-cephalic margin armed on distal three-fourths with eleven to twelve spines, distal series three in number;

¹From γαλή—pole-cat, in allusion to the odor of certain species of the genus.

ventro-caudal margin with three to four spines on distal half. Caudal tibiae appreciably surpassing caudal femora in length, distinctly inflated, narrowing at proximal extremity, distinctly deplanate; extensor face narrow, margins of extensor face distinct, but not carinate: caudal tarsi in length about equal to three-fourths of that of tibiae, compressed; caudal metatarsus subequal in length to remaining caudal tarsal joints; pulvillus of metatarsus occupying the distal fourth of the latter.

ALLOTYPE.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

Differing from the description of the type in the following noteworthy features.

Size slightly larger. Pronotum slightly more transverse, greatest length contained one and two-fifths times in greatest width of same. Interspace between tegmina slightly greater than in male, equal to one and one-third times the proximal width of a single tegmen. Supra-anal plate of the type usual in females of this genus, considerably produced; distal margin arcuate-emarginate, lateral angles obtuse-angulate; surface of plate arcuate-tectate in transverse section, weakly and restrictedly impressed proximo-laterad. Subgenital plate not prominent; distal margin obtuse-angulate with a very faint arcuation.

General color ochraceous-buff to near ochraceous-orange, very faintly pinkish beneath on the coxae. Dark pattern blackish fuscous, very much restricted, indicated almost solely as abdominal segmental marginings, suffusion of the venter of the abdomen and markings of the head and limbs. Head with a broad interocular bar, this ferruginous to fuscous, paler dorsad, stronger ventrad, the ventral margin more decided than the dorsal one; eyes fuscous; antennae of the general color, the proximal segments, other than the three basal ones, each darkened proximad with vinaceous-rufous (type) to carob brown. Pronotum with the entire cingulate margin lined with fuscous to burnt umber, the caudal margin with a narrow additional clouding of the same in the area usually broadly darkened in this genus; disk with obsolete indications, by sparse fine points and weak clouding, of a horseshoe pattern, but this is never strongly marked. Tegmina with costal margin pencilled with ferruginous; metanotum laterad edged with the same; caudal margins of mesonotum and metanotum marked similarly to the caudal margin of the pronotum. Abdomen with tergites transversely barred with blackish fuscous, these bars represented on the caudal section of each individual tergite and the proximal section of the succeeding tergite, bars narrowing very shortly before reaching the lateral margins, the latter and the remainder of the segmental caudal margins finely pencilled, this passing from the fuscous of the caudal margins to the ferruginous of the lateral margins: supra-anal plate rather narrowly transversely fuscous proximad; cerci ochraceous-buff to ferruginous, becoming paler distad; venter of abdomen fuscous to mars brown mesad, this varying from one extreme, which suffuses all of the venter of the abdomen except broad pale lateral margins of the sternites, to another where the dark area is limited to a median cloud covering the subgenital plate and most of the three distal sternites, the remainder pale; in the types between these two extremes the sternites included in the pale areas are margined with fuscous similar to the tergites. Limbs with spines hay's russet, fuscous tipped: caudal tibiae with a narrow distal liver brown margining, which extends proximad on flexor section of the dorsal and ventral faces as a vanishing cloud.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Proximal Width of Tegmen	Length of Caudal Tibia
♂, type....	20	6.7	9	3.7	3.4	8.7 mm.
♂, paratype	21.5	7.4	10	4.5	3.8	9
♀, allotype.	24.5	7.8	11.2	4.2	4	9.2

In addition to the type and allotype we have before us a paratypic male, a paratypic female (minus the apex of the abdomen) and an immature female, all bearing the same data as the type.

These specimens show no structural differences of noteworthy importance, except in the number of spines on the margins of the cephalic femora. On the ventro-cephalic margins these vary from eleven to thirteen, the latter number being present solely on one limb of the type. On the ventro-caudal margin the number of spines varies from three to four.

Eurycotis dimidiata (Bolivar)¹

Plate XIII, Figures 8 and 9

P[olyzosteria] dimidiata BOLIVAR, 1888, Mém. Soc. Zool. France, I, p. 125. ♂; Guantanamo, Cuba.

CUBA.—Arroyo Hondo, Guantanamo, Oriente Province, XI, 1913, (C. T. Ramsden), 1♂, 3♀, [A. N. S. P.].

Rio Seco Woods, San Carlos Estate, 12 kilometers from Guantanamo, Oriente Province, X, 4-8, 1913, (F. E. Lutz; in rotten logs), 2♀.

This species was recorded from under stones in the fields of Yateras, Oriente Province, by Gundlach. It would seem, from the data at present available, to be restricted in distribution, and probably limited to the eastern end of the island.

The resemblance of *dimidiata* to *galeoides* is very considerable, but the solidly dark apex of the abdomen of *dimidiata* will serve to separate the two.

¹Of the material recorded as *E. caraibea*, adventive in the United States, by Hebard (1917, Mem. Amer. Entom. Soc., II, p. 266), the Berwick, Pennsylvania individual should be referred to *dimidiata*, while the Ithaca specimen was correctly determined as *caraibea*. Hebard, in a footnote, has called attention to features of difference of the Berwick specimen from the Ithaca individual and the original description, but attributes these to individual variation. This the present series shows is not the case. His Berwick specimen was much discolored, the ocher base color much darkened by grease and the contrast of the dark abdominal bars reduced in consequence from the same cause, the general appearance thus much resembling *caraibea*, aside from the tegminal shape and proportions of the interspace between the tegmina.

It will be seen from the accompanying figure (Plate XIII, fig. 8) that the tegmina are more narrow and less subquadrate than in *galeoides*, while the interspace between the tegmina is appreciably greater. The transverse dark abdominal barring of *dimidiata* is narrower than in *galeoides*, while the ventral surface of the abdomen is solidly dark, except for the narrow ochraceous margining of the four proximal sternites. The limbs are more stocky than in *galeoides*, but the caudal tibiae in structure are much as in the other species. The infuscation of the distal portion of the caudal tibiae is marked and extends in a weakened condition proximad along what might be called the ridge of the dorsal and ventral faces, and the flexor surface, to the proximal region.

The male supra-anal plate is transverse, the distal margin very broadly and very shallowly obtuse-angulate emarginate, the lateral angles of the same very narrowly rounded, the distal margin with a regular series of spaced hairs; surface of the plate moderately impressed laterad. Cerci of male about twice as long as the plate, fusiform, attenuate distad, the dorsal surface deplanate. Subgenital plate of the type usual in the males of this genus; styles elongate, tapering, faintly incurved, the apices moderately acute. Concealed genitalia with the sinistral hook having its apex strongly recurved, the outer surface of the curve of the apex with a rounded obtuse angle, the apex proper decurved, non-spinose; dextral spine flattened transversely, upcurved, faintly narrowing distad to within a short distance of the apex, at which point it abruptly narrows to the subulate and very acute apical spination, the base of the dextral spine with a supplementary acute, but apically blunted, lobe. The female supra-anal plate is appreciably produced, subtrigonal, the distal margin with the emargination relatively deep and decided, from slightly obtuse to rectangulate in shape; surface of the plate tectate in transverse section, subdepressed laterad. Subgenital plate of female with distal margin subrectangulate; in profile the lateral outline of the plate has the distal portion truncate.

Eurycotis scalaris,¹ new species

Plate XIV, Figures 1 and 2

This species is more nearly related to *E. dimidiata* and *caraibea* than to any others. From *dimidiata* it can be distinguished by the peculiar marking of the proximal abdominal tergites, the non-inflated caudal tibiae, the generally subtruncate form of the male supra-anal plate and the more elongate dextral hook of the internal genitalia of the same sex, this hook also bearing an elongate supplementary proximal

¹In allusion to the character of the coloration of the proximal abdominal tergites.

spine. From *carai-bea* the lateral lobiform tegmina, the maculate proximal abdominal tergites and the coloration of the venter of the abdomen will readily distinguish *scalaris*.

TYPE.—Male; Arroyo Hondo, Guantanamo, Oriente Province, Cuba. November, 1913. (C. T. Ramsden.) [Academy of Natural Sciences of Philadelphia, Type No. 5365.]

Size relatively small (for the genus); form elliptical, moderately depressed; surface weakly polished.

Head almost entirely hidden under pronotum, its greatest width across eyes subequal to greatest head depth; occiput, with eyes, regularly arcuate; interspace between eyes appreciably broader than that between antennal scrobes. Palpi of the general type usual in genus. Antennæ not complete, clearly surpassing body in length when perfect.

Pronotum semi-ovate,¹ with its greatest length equal to one and one-third times its greatest width: cephalic margin truncate, distinctly rounding laterad into the arcuate lateral margins, which are very faintly flattened on their cephalic portion; caudal margin truncate, faintly arcuate laterad to the rounded rectangulate caudo-lateral angles, all margins finely cingulate: in transverse section the pronotum is regularly arcuate, latero-cephalad faintly subcucullate.

Tegmina lateral, lobiform, narrowing distad, apex subtruncate and not surpassing distal margin of mesonotum, interspace between tegmina equal to one and one-half times proximal width of single tegmen; proximal width of tegmen contained one and one-half times in length of same; costal margin of tegmina arcuato-truncate, cingulate, disto-costal angle rounded rectangulate; sutural margin obliquely subarcuate; distal margin arcuato-subtruncate. Mesonotum with distal margin sinuato-truncate: metanotum with distal margin broadly and very shallowly arcuato-emarginate, with a median, slightly sub-acute lobulation; lateral margins of metanotum cingulate, caudo-lateral angles rectangulate.

Abdomen with lateral margins of sternites cingulate, caudo-lateral angles progressively acute-angulate to produced acute spiniform. Supra-anal plate transverse, lateral margins converging, distal margin transverse truncate, with a small, shallow but evident, median emargination, lateral angles very narrowly rounded; surface of supra-anal plate with a pair of distinct impressions disto-mesad, between them being a slight tectation. Cerci twice as long as supra-anal plate, moderately broad, fusiform, attenuate distad, apex acute, dorsal surface deplanate. Subgenital plate of the general type found in related species; styles elongate, tapering, slightly arcuate, apices weakly blunted. Concealed genitalia: sinistral hook of the general type found in *E. dimidiata*, but recurved portion heavier, broader, more truncate distad and with outer margin rounded rectangulate: dextral spine elongate, erect, weakly sinuate, slender, regularly tapering, not lamellate, apex spine-like; at base of main spine is a supplementary lobe which develops distad rather abruptly into an aciculate, very straight spine, which is parallel to and not greatly shorter than the main spine.

Limbs moderately robust. Cephalic femora with ventro-cephalic margin having eight to ten spines on distal two-thirds, distal group of spines three in number, markedly increasing in length distad. Caudal tibiæ about one and two-fifths as long

¹The description of the form of the pronotum is checked from the paratypic male, as the type has the pronotum somewhat crushed. The type, however, is more complete otherwise than is the paratype.

as caudal femora, uninflated, subequal in width, not appreciably depressed; extensor surface relatively broad, not delimited by evident margins, regularly rounding into cephalic and caudal faces. Caudal tarsi about three-fourths as long as caudal tibiæ, appreciably compressed; metatarsus very faintly shorter than remaining tarsal joints; metatarsal pulvillus covering about distal fifth of metatarsus.

General coloration ochraceous-buff, occasionally (paratype) tending toward ochraceous-orange. Dark pattern, which is marked solely on the abdomen, occiput and caudal limbs, blackish fuscous. Head with the dark interocular bar broad; antennæ pale tawny, passing to russet distad; eyes prout's brown (type) to clove brown (paratype). Pronotum with the cingulate margins pencilled with fuscous, the caudal one occasionally (type) paler, more chestnut-brown; disk of pronotum with a poorly defined, weakly mars orange suffusion, this with a few subobsolete bay points. Tegmina and metathorax with costal (tegmina) or lateral (metanotum) margins pencilled with fuscous; caudal margins of meso- and metanotum pencilled similarly to that of pronotum; disk of meso- and metanotum with a few points of bay. Abdomen above with the four distal tergites solidly dark, the proximal tergites with transverse dark bars, these narrowly failing to reach the lateral margins of the tergites, nearly equal to the full length of the tergites at their lateral margins, and regularly narrowed to not more than half that width mesad, a small but distinct median widening of the bar producing a "vertebral" effect; ventral surface of the abdomen solidly dark, with very narrow pale borders on the equivalents of the tergites so supplied on the dorsal surface: supra-anal plate and cerci dark, washed with liver brown; cerci with a little ochraceous pre-apically, the tips dark. Limbs with spines russet to mars brown; caudal tibiæ distad narrowly washed with mars brown; caudal tarsi chestnut, the distal joint passing to burnt sienna.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen	Length of Caudal Tibia
♂, type.....	21.2	6.6	9 ¹	3.5	3.1	8.2 mm.
♂, paratype	23.4	7.2	9.6	3.6	3.1	9

In addition to the type we have before us a paratypic male bearing the same data as the type. This specimen is more rufescent than the type, and is slightly larger, but otherwise very similar. The two specimens show that the number of spines on the ventro-cephalic margin of the cephalic femora (aside from distal pair) varies from nine to twelve, there being a difference of two on the two limbs of each of the specimens, while the ventro-caudal margins of same show four in both individuals.

¹Estimated on account of crushing of pronotum.

Eurycotis caraibea (Bolivar)¹

Plate XIV, Figures 3 and 4

P[olyzosteria] caraibea BOLIVAR, 1888, Mém. Soc. Zool. France, I, p. 126. ♂; Cuba.

CUBA.—Monte Libano, Oriente Province, IV, 13, 1913, (C. T. Ramsden), 1 ♂, 1 immature ♀, [A. N. S. P.].

In its uniformly pale coloration of the thorax, tegmina and proximal abdominal tergites, with the solidly dark distal abdominal tergites, and in the absence of barring from the pale proximal abdominal tergites, added to the transverse sub-rectangulate tegmina, this species is readily distinguishable from the other West Indian forms. The venter of the abdomen is solidly dark distad, with the proximal sternites dark with pale lateral borders of variable width.

The caudal tibiae are appreciably but not decidedly inflated, narrowing proximad, weakly depressed; extensor face relatively broad, margins of extensor face not sharply marked. Supra-anal plate of male transverse, distal margin rather weakly bilobate, the median emargination relatively broad, not deep, obtuse-angulate, the distal margin supplied with a sparse series of regularly placed hairs; distal half of the plate with surface bi-impressed. Concealed genitalia of male; sinistral hook much as in *scalaris* but with extremity smaller and proximal portion more robust; dextral spine relatively broad, sublamellate proximad, mesad rather sharply narrowing to the distal portion, which is elongate, aciculate spiniform.

Gundlach reported this species from Yateras, east of Guantanamo, and it may be restricted in distribution to eastern Cuba.

Eurycotis tibialis Hebard

Eurycotis tibialis HEBARD, 1916, Entom. News, XXVII, p. 264, Pl. xiv, fig. 1 and text fig. ♂; San Francisco Mountains, Dominican Republic, Hispaniola: ♀; "San Domingo," Hispaniola: ♀; (adventive at) Orono, Maine.

This species, with *E. flavipennis* Saussure and Zehntner, represents a very distinct group, characterized by a more peculiar and decided expansion and impression of the caudal tibiae, as emphasized in the key to the species given in this study. From the description of *flavipennis* the present form can be distinguished by its solidly uniform coloration and very distinctly larger size, and doubtless by features of the male genitalia, which sex of *flavipennis* is not known at this writing.

¹As we have stated above in a footnote under *E. dimidiata*, of the two specimens recorded by Hebard as *E. caraibea*, as adventive in the United States (1917, Mem. Amer. Entom. Soc., II, p. 266), one, that from Ithaca, New York, represents *caraibea*, the other, from Berwick, Penna., is a specimen of *dimidiata*. For comments see the footnote in question.

We have seen no material of *tibialis* additional to that used in the original description.

Eurycotis flavipennis Saussure and Zehntner

Eurycotis flavipennis SAUSSURE AND ZEHNTNER, 1893, 'Biol. Cent.-Amer., Orth.,' I, pp. 70, 71. ♀; Cuba.

We have not examined this species, which is apparently closely related to *E. tibialis*, treated above. There is, apparently, an omission of the word "tibix" in the original description a portion of which reads as follows: "Femora rufescentia, apice et marginibus subtus fuscis; posteriora subdilatata, apice leviter attenuata, faciebus binis planatis, subexcavatis punctatisque." It is evident to us that the word "tibix" has been omitted from between "posteriora" and "subdilatata," as we know of no cockroaches having femora so constructed, while the punctuation suggests, and the features described picture, the type of development found in *tibialis*, so that we feel no hesitation in suggesting an omission has been made. No mention is made anywhere else in the description of the tibix. The features of difference from *tibialis*, after inferring a tibial similarity, have been given above under that species.

Eurycotis similis Caudell

Eurycotis similis CAUDELL, 1922, Univ. of Iowa Studies in Nat. Hist., X, p. 22, fig. 1. ♂, ♀; Antigua.

This striking species, of which we have before us a paratype female from Antigua, received in exchange from the United States National Museum, through the kindness of Mr. Caudell, bears a close general resemblance to the Trinidadian *E. decipiens* (Kirby), which clearly is a member of the same species group as *similis*. Not having the male of *similis* it is not possible for us to compare the genital or other characters of that sex in the two species. A few notes drawn from the Antigua female of *similis* and a Trinidad male of *decipiens* may, however, prove of service. The face in *similis* bears the three dark bars as described by Caudell, while in *decipiens* there is the transverse bar on the vertex and a large irregularly trigonal blotch on the lower section of the face. The pronotum is not strongly and completely cingulate with a border of pitch black as in *decipiens*, instead this feature being weak and subobsolete caudo-laterad and narrow laterad; pronotal disk patch nearly "horseshoe-shaped," instead of being two nearly disconnected patches as in *decipiens*. The solidity of the dark coloration of the dorsal surface of the abdomen, instead of having transverse pale areas as in *decipiens*, and the

uniformly dark color of the apex and most of the venter of the abdomen, are most distinctive. Structurally the caudal tibiæ of *similis* show no fusiform inflation in the female sex, when seen from above, while this feature is pronounced in the male of *decipiens*; when seen in lateral (extensor) aspect the caudal tibiæ show pronounced inflation in *similis*, while *decipiens* in this view shows none.

It is clearly evident that *decipiens* and *similis* are derivatives of a common stock, but in the present state of our knowledge we are unable to suggest from what center they developed. It is remarkable, however, that the nearest relative of a Trinidadian species should be found in Antigua, and not in one of the larger islands of the Lesser Antilles more directly in the axis of the chain.

Eurycotis opaca (Brunner)¹

P[olyzosteria] opaca BRUNNER, 1865, 'Nouv. Syst. Blatt.,' p. 216. ♂; Cuba.

P[olyzosteria] finschiana SAUSSURE, 1872, 'Mélange. Orthopt.,' II, pp. 106, 111. ♂, ♀; Cuba.

Polyzosteria cabreræ BOLIVAR, 1881, An. Soc. Españ. Hist. Nat., X, p. 335, Pl. VIII, fig. 3. ♂, ♀; Cuba.

CUBA.—Twelve and one-half kilometers south of Pinar del Rio, Pinar del Rio Province, IX, 12–23, 1923, (C. W. Leng; in pine and palmetto region), 1 immature ♀. Baños de San Vicente, seven kilometers north of Viñales, Pinar del Rio Province, IX, 16–22, 1913, (C. W. Leng; on palm), 1 very immature individual. Cotorro, Havana Province, IX, 1918, (José Cabrera), 2 ♂; V, 1922, (José Cabrera), 1 ♀, 5 immature specimens, [A. N. S. P.]. Camoa, Havana Province, V, 30, 1922, (José Cabrera), 8 immature specimens; VI, 11, 1922, (José Cabrera), 1 immature ♂, [A. N. S. P.]. Tapaste, Havana Province, (José Cabrera), 1 ♂, [A. N. S. P.]. Santiago de las Vegas, Havana Province, IV, 1905, (George Dimmock), 2 ♂, 2 immature ♀, [U. S. N. M.]. San Antonio de los Baños, Havana Province, IV, 1905, (George Dimmock), 1 immature ♀, [U. S. N. M.].

In addition to these specimens we have before us material from Varadero, Matanzas Province, north coast of Cuba, and San Diego de los Baños, Pinar del Rio Province, all of which have been mentioned by Hebard.² The specimen reported as *opaca* by the same author from Sancti

¹The records of *E. floridana* (Walker) from Cuba, made by Rehn (1903, Trans. Amer. Entom. Soc., XXIX, p. 277; 1909, Second Rep. Cent. Exper. Stat. Rep. Cuba, p. 185), relate to *E. opaca*, which since has been critically compared with *E. floridana* by Hebard (1917, Mem. Amer. Entom. Soc., II, p. 166).

²Idem, p. 166, footnote 271.

Spiritus, Santa Clara Province, Cuba,¹ as well as the adventive, then reported, taken at Orono, Maine, represent the closely related and here described *E. taurus*.

The synonymy given above is quite evident after a critical examination of the total series of six adult males, one adult female and twenty immature specimens of the species now before us, and of the original descriptions involved. It is evident that the present species exhibits variations in coloration, i. e., in the presence or absence of ochraceous or ochraceous-orange lateral margins to the pronotum, tegmina and mesonotum, parallel to the conditions seen in *E. floridana*, which have been fully treated by Hebard.² Saussure's *finschiana* was clearly based on immature individuals, without tegmina, having the broad pale lateral dorsal thoracic bands. Bolivar's *cabreræ* was based on adults possessing the same type of coloration.

Of the specimens before us one male and the female from Cotorro, the Tapaste and Santiago de las Vegas adults have the pale lateral margins well indicated, as is the case with the San Antonio de los Baños and Santiago de las Vegas immatures; that from Varadero and that from south of Pinar del Río and a San Diego de los Baños female have the bars weakly marked, while the other adults and an immature female from San Diego de los Baños and another from Camoa have virtually no indication of them. The bicolored Cotorro male is noteworthy in having the medio-caudal portion of the pronotal disk and the greater portion of the metanotum solidly pale, while small lateral triangular blotches are indicated on the proximal abdominal tergites. This specimen is thoroughly hardened and its coloration had no doubt been fully fixed before its death. The Tapaste male, however, is teneral, and its coloration may not represent exactly what would have been retained in the thoroughly hardened adult. In this specimen the dark bars of the pronotum are broadly connected cephalad and narrowly so caudad; the enclosed light spot is brazil red, while the discoidal and anal areas of the tegmina are english red, with the medio-proximal section of the proximal tergites and most of the distal tarsal joint brazil red. These specimens, with indications seen in the immature individuals from Cotorro Camoa, Varadero, and Santiago de las Vegas, would seem to show that the dark marking was more primitively a bilineate pattern, its solidity being a feature of maximum development of the infusate tendency.

¹Idem, p. 267.

²1917, Mem. Amer. Entom. Soc., No. 2, pp. 166-170.

Immature material from Cotorro showing marked pale lateral borders represents five instars, and of these specimens quite a few exhibit a relatively paler central section of the disk, this being distinctly and broadly indicated in one of the youngest specimens with pale lateral bars.

It is quite possible that *opaca* is limited to the western portion of the island of Cuba, and that it is replaced in the central and eastern sections by the following species (*taurus*). All the previous exact records of the species are clearly from localities west of Oriente Province, except Gundlach's report of its occurrence at Santa Maria del Rosario, a locality which we have not been able to locate definitely, although it may be one of the two "Santa Marias" given for Cuba, both of which are in Oriente Province. Gundlach's record, if from the latter province, probably refers to *taurus*, here described. Rehn and Hebard individually have recorded the species from a number of localities in western Cuba, and it has also been recorded from Los Indios, Isle of Pines (as *finschiana*) by Holland and Kahl.¹

Eurycotis taurus, new species

Plate XIV, Figures 5 to 8

Eurycotis opaca HEBARD, 1917, Mem. Amer. Entom. Soc., No. 2, p. 166, footnote 271. (In part not of Brunner, 1865.) ♀; Sancti Spiritus, Santa Clara Province, Cuba.

Eurycotis opaca HEBARD, 1917, idem, p. 267. ♀; Adventive at Orono, Maine.²

This species is a close relative of *E. opaca* Brunner, which it may replace in central and eastern Cuba. From *opaca* the present species differs in its somewhat greater size, more robust build, more decided punctulation of the surface in the male sex, the abdomen also semi-shagreenous, in the relatively shorter and more transverse tegmina, in the supra-anal plate of the male being strongly transverse, with its caudo-lateral angles produced laterad into recurved horn-like spines, the plate also strongly concave transversely, in the relatively longer caudal tibiae, and in the character of the spiniform production of the seventh abdominal tergite. The development of the wings in the female individual we are describing as the allotype is, we feel certain, an unusual condition, although the Central American *E. quadri-squamata* Saussure and Zehntner³ has distinct articulate wings as well as lateral tegmina developed in the female sex, the only one known of the species. We would prefer to consider the

¹1916, Ann. Carneg. Mus., X, p. 541.

²At that time an immature male taken as an adventive at Rochester Mill, Pennsylvania, was also recorded as *opaca*. This specimen is not at present available for re-examination and its correct specific position in consequence not determinable. In 1917 but a single species of this group of the genus was known aside from the North American *floridana*.

³1893, 'Biol. Cent.-Amer. Orth.', I, pp. 70, 71, Pl. iv, fig. 40.

wing development of this allotypic female as atavistic, in view of the lack of such noticeable development in the otherwise typical females of the species before us.

TYPE.—Male; Vicinity of Sama, Oriente Province, Cuba. (Taken from fruit steamer "Joseph C. Cuneo" at Philadelphia.) June 24, 1921. (Max Kisiuk.) [Hebard Collection, Type No. 823.]

Size large; form robust; surface impresso-punctulate, becoming finely acute spiculose and semi-shagreenous on dorsum of abdomen.

Head visible cephalad of pronotum for almost its entire width, as seen from dorsum; greatest width of head across eyes nearly equal to greatest depth of same, in outline almost circular; interocular space very broad, equal to that between antennal scrobes, distinctly broader than area between ocellar spots: eyes but faintly indicated in head outline; ventral point of eyes not extending ventrad of ventral margin of antennal scrobes; antennæ distinctly longer than body.

Pronotum semi-elliptical in outline, its greatest length contained about one and one-half times in greatest (caudal) width of same: cephalic margin moderately arcuate, passing by broadly arcuate cephalo-lateral angles into the broadly arcuate lateral sections; caudo-lateral angles narrowly rounded rectangulate; caudal margin subtruncate; all margins very narrowly cingulate: in transverse section the pronotum is distinctly arcuate; surface with a weakly elevated and smoother pair of large, sub-reniform areas, poorly outlined and median in position.

Tegmina transversely rectangulate, their length no greater than half of median length of pronotum, greatest length contained nearly one and two-thirds times in their greatest width: costal margin nearly straight, cingulate; distal margin subtruncate, weakly sinuate; sutural margin arcuate, more sharply so proximad, tegmina overlapping in distal half of this margin: surface with venation weakly indicated. Wings absent. Metanotum with caudo-lateral angles rectangulate; median section of caudal margin of metanotum hardly at all produced mesad.

Abdomen with tergites to seventh having caudo-lateral angles acute-produced, of seventh acute produced with an arcuate lamellation on internal face. Supra-anal plate strongly transverse, median length contained slightly more than three times in proximal width of same; from cercal insertion to caudo-lateral angles lateral margins are weakly concave, distinctly convergent; distal margin transverse, very weakly biarcuate with a very shallow median emargination, the margin and ventral surface of plate with numerous recurved shagreenous teeth directed toward median line of body; caudo-lateral angles of plate produced into laterad directed, recurved, spini-form hooks or horns; surface of plate transversely concave, distal section appreciably curved dorsad, this more pronounced laterad than mesad. Cerci relatively short, but little longer than supra-anal plate, subfusiform, moderately depressed. Subgenital plate of general type found in genus, median section with margin weakly arcuate, stylar sockets relatively deep; styles simple, tapering, acuminate. Genital hook relatively heavy, see Plate XIV, figure 7 for form.

Limbs robust. Cephalic femora with eleven spines on distal three-fourths of ventro-cephalic margin, distal spines of same margin three in number; ventro-caudal margin with four large spaced spines in distal half, one disto-apical in position. Median and caudal femora with ventral margins strongly spined. Caudal tibiae one-fifth longer than femora, robust, subequal in width, not inflated, moderately depressed,

as seen from extensor surface not at all fusiform or bullate, marginal and central carinulae of that surface all subparallel. Caudal tarsi two-thirds as long as caudal tibiae, metatarsus forming slightly less than one-half of tarsal length; pulvilli large; arolia large.

ALLOTYPE.—Female; Ojo de Agua de Filipinas, Oriente Province, Cuba. (C. T. Ramsden.) [Academy of Natural Sciences of Philadelphia.]

The present sex differs from the above description of the male in the following noteworthy respects.

Size very large. Head with interocular space slightly greater than that between antennal scrobes. Tegmina in general type similar to those of male, but with greatest length costal and contained one and one-third times in greatest proximal width; costal margin more arcuate distad than in male, disto-costal angle narrowly rounded rectangulate, reaching nearly as far caudad as caudal margin of metanotum; sutural margin equal to two-thirds of length of costal margin, much more gently arcuate than in male; distal margin moderately oblique, truncato-concave; surface with venation essentially as in male. (Wings present as lateral articulate pads, in width equal to nearly one-third that of tegmen, projecting distad of same by a small fraction of tegminal length.) Supra-anal plate with greatest length of plate contained nearly twice in proximal width of same, subtectate in transverse section distad, of same general shape as in *opaca*, but disto-lateral angles more declivent, lateral margins less sigmoid and medio-distal emargination nearly semicircular in shape. Subgenital plate with valves relatively longer and narrower when compared with those of *E. opaca*.

General color pitch-black, uniform and solid, with the following exceptions: ocellar spots, interior of antennal scrobes, pulvilli and usually most of coxæ, cream-color to ochraceous-buff, the coxæ generally washed proximad and mesad with ferruginous to kaiser brown in the male and with the general color in the female. In the female sex frequently there is distinctly, and in the male more obscurely, indicated a median to proximo-median blotch of rufous on the cephalic face of each coxæ. Clypeus and labrum dully tawny to ferruginous; mandibles hay's russet to brick red. Antennæ dark proximad, passing to ferruginous (♂) or hay's russet (♀) distad.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, <i>opaca</i> , Varadero, Cuba.....	33.3	11	15.5	7	10 mm.
♂, <i>taurus</i> , type.....	37	12.9	18.6	7.5	11.5
♀, <i>taurus</i> , Sancti Spiritus, Cuba, paratype..	41.8	12.9	18.2	8.4	12.2
♀, <i>taurus</i> , Ojo de Agua de Filipinas, Cuba, allotype.....	46 ¹	13.9	19.6	10.7	13.5
♀, <i>taurus</i> Silla de Gibarra, Cuba, paratype..	37.5	13.2	19.2	7.6	12.8

¹Abdomen somewhat unnaturally distended.

In addition to the type and allotype we have before us two paratype females, in the collections of the Academy of Natural Sciences of Philadelphia; one from Sancti Spiritus, Santa Clara Province, Cuba, taken April, 1904, by Dr. Henry A. Pilsbry; and the other from Silla de Gibara, Oriente Province, Cuba, taken by José Cabrera. The adventive female taken at Orono, Maine, mentioned above, has also been examined, as well as an immature female, in one of the later instars, bearing the same data as the type. This specimen is 30.5 millimeters long and exhibits a strongly contrasted coxal color pattern.

Eurycotis cribrosa,¹ new species

Plate XIV, Figure 9

This remarkable species needs comparison with no other. Its heavy, deep form, hard and deeply punctate integument and strikingly colored black body and yellow tegmina, which latter are lateral, immediately differentiate the species. In addition it is the only Cuban species which has the caudal metatarsal pulvillus covering the greater portion of the metatarsal length.

TYPE.—Male; Los Caños, Guantanamo, Oriente Province, Cuba. May 25, 1914. (C. T. Ramsden.) [Academy of Natural Sciences of Philadelphia, Type No. 5266.]

Size rather under medium; form elongate ovate, very robust, deep, subdepressed, dorsum convex transversely, abdomen broader than prothorax; surface moderately shining dorsad, there with pronotum sparsely impresso-punctate, this tendency increasing in density caudad, until on distal abdominal tergites and supra-anal plate the surface is strongly and closely cribrate; tegmina with surface distinctly impresso-punctate.

Head with occiput narrowly visible cephalad of pronotum when seen from dorsum, greatest depth of head subequal to width of head across eyes; occiput, with eyes, regularly and moderately arcuate; interspace between eyes slightly greater than that between antennal scrobes; face subdeplanate ventrad. Palpi relatively robust; third joint deeper than usual; fourth joint very faintly shorter than third joint, infundibuliform; fifth joint subequal in length to the third joint, ventral margin regularly arcuate. Antennæ subequal to body in length.

Pronotum transverse, greatest length contained one and one-half times in greatest width of same, semi-circular in outline: lateral and cephalic margins regularly arcuate, caudal margin truncate; latero-caudal angles rounded rectangulate; lateral margins distinctly but finely cingulate, caudal margin not distinctly cingulate: surface of pronotum regularly and decidedly arcuate in transverse section.

Tegmina lateral, subquadrate but appreciably transverse, interspace between tegmina slightly more than twice proximal width of a single tegmen, in length faintly if at all surpassing distal margin of mesonotum: costal margin weakly arcuate, cingu-

¹In allusion to the deep and regular pitting of the abdomen.

late; sutural margin more decidedly arcuate; distal margin weakly oblique, sub truncate; disto-costal angle rounded rectangulate; disto-sutural angle broadly rounded obtuse. Metanotum with distal margin broadly, very faintly and shallowly concave; lateral margins of metanotum arcuato-truncate, cingulate, disto-lateral angles rectangulate.

Abdomen broad, lateral margins of tergites cingulate; disto-lateral angles acute, progressively sublamellate distad. Antepenultimate abdominal tergite with its distal margin broadly and weakly sigmoid laterad and having a broad, shallow median emargination, as a whole weakly suggesting the development seen in females of the African genus *Deropeltis*. Supra-anal plate moderately transverse, lateral margins regularly converging, distinctly but not strongly bilobate distad, median emargination shallowly rounded obtuse-angulate; in transverse section plate is hardly tectate. Cerci very short, not more than two-thirds as long as supra-anal plate, very broad fusiform, apex acute but not produced, deplanate dorsad. Sub-genital plate relatively small, distal margin nearly rectangulate in outline, in profile the apex of plate is subtruncate.

Limbs very robust, short, smooth. Cephalic femora with nine spines in the regular series on ventro-cephalic margin, the distal group of spines with the two more distad sharply differentiated and subequal in size, considerably larger than the more proximal one; ventro-caudal margin with four spines. Caudal tibiae one and one-half times as long as caudal femora, broad, fusiform, strongly narrowing proximad, depressed; extensor face moderately deplanate, margins strongly carinate. Caudal tarsi about three-fifths as long as caudal tibiae, appreciably compressed; caudal metatarsus slightly shorter than remaining tarsal joints; pulvillus of caudal metatarsus elongate, extending proximad in an acute prolongation, occupying three-fourths of ventral surface of metatarsus.

General color solidly fuscous-black. Tegmina apricot yellow, the punctations and the cingulate lateral margins of the general color. Eyes light drab to hair brown. Ocelli very minute, buffy.

Female (type).—Length of body, 23.8 mm.; length of pronotum, 6.7; greatest width of pronotum, 10.2; length of tegmen, 2.9; proximal width of tegmen, 3.4; length of caudal tibia, 7.2.

Female (paratype).—Length of body, 22 mm.; length of pronotum, 7; greatest width of pronotum, 11.1; length of tegmen, 3.5; proximal width of tegmen, 3.8; length of caudal tibia, 6.4.

In addition to the type we have before us a paratypic female bearing the same data as the type, and three very immature individuals taken at Baracoa, Oriente Province, Cuba, November, 1915, and from the collection of W. T. Davis. These latter specimens are quite small (10 to 12.5 mm. in length of body), represent two instars, and show, as clearly as could be expected in their immature condition, the structural characters of the adult. The pulvillus of the caudal metatarsus shows a very decided beginning of the elongation so pronounced in the adult. The particularly striking features of these individuals is in the coloration. This is solid black except that the pronotum has the cephalic and lateral

margins continuously margined with ochraceous, on the cephalic margin rather narrowly so, on the lateral ones regularly broadening caudad, sharply oblique arcuato-truncate at the latero-caudal angles.

HENICOTYLE,¹ new genus

This new genus of the Blattinæ is made necessary by the peculiar characters of its genotypic, and at present, unique species, which was described by Brunner as *Stylopyga antillarum*, later referred by him to the genus *Eurycotis*.² Neither association is correct, as exhaustive comparisons show.

The genus is probably more nearly related to *Blatta* (i. e., *Stylopyga* of authors) and *Neostylopyga* Shelford, as represented by their genotypes, *Blatta orientalis* and *Neostylopyga rhombifolia*, than to any of the other genera of the subfamily. Its leading characters of difference from these genera are: the caudal tarsi are very slender and elongate, moderately compressed, with the metatarsus appreciably longer than remaining joints; fourth joint of the caudal tarsi is the only one bearing a pulvillus, this short and apical; the supra-anal plate of female is transverse, not produced, margin very faintly arcuate, not emarginate. In the form of the female supra-anal plate this genus has a unique position in the group of genera to which it clearly belongs, while in the allied genera we find no such tarsal development as in *Henicotyle*, the pulvillus features being equally unique. There is no real relationship to *Eurycotis*, *Lamproblatta* or *Pelmatosilpha*.

GENERIC DESCRIPTION.—Ovate, subdepressed, semi-apterous, surface glabrous. Eyes widely separated; antennæ elongate, setaceous. Pronotum transverse, subparabolic; caudal margin truncate; caudo-lateral angles rounded rectangulate. Tegmina reduced, lateral, sublanceolate; interspace of mesonotum separating tegmina broad, far surpassing tegminal width. Wings absent. Male unknown. Supra-anal plate of female short, strongly transverse, distal margin arcuate, unproduced, entire. Cerci large, fusiform. Subgenital plate of female with valves distinct, relatively small. Cephalic femora with ventro-cephalic margin bearing "Type A" spines; ventro-caudal margin spined. Tarsi slender, compressed; caudal tarsi four-fifths as long as caudal tibiae; caudal metatarsus longer than remaining caudal tarsal joints: ventral surface of tarsal joints regularly biseriate spinulose; dorsal and lateral surfaces of all tarsi chaeto-spinulose; pulvillus present solely on fourth joint of all tarsi; arolia present.

GENOTYPE.—*Stylopyga antillarum* Brunner.

¹From *ἐνικο-τυλή*, i. e., single pad, in allusion to the single tarsal pulvillus.

²1893, Proc. Zool. Soc. London, 1893, p. 603.

Hemicotyle antillarum (Brunner)

Plate XIV, Figure 10

S[tylopyga] antillarum BRUNNER, 1892, Proc. Zool. Soc. London, 1892, p. 204, Pl. xv, fig. 5. ♀; St. Vincent, West Indies.

DOMINICA.—Laudet, VI, 12, 1911, (Miner; from rotting wood and wood soil), 1 ♀.

The genus and species readily can be distinguished from the other members of the subfamily in the West Indies by the possession of a non-produced, non-emarginate transverse supra-anal plate in the female sex. The species is known only from the original description and the present record.

In size the specimen before us measures: length of body, 12 mm.; length of pronotum, 4; length of tegmen, 2.1; length of caudal tibia, 4.9.

We have figured the very interesting structure of the caudal tarsus of this genus and species.

Blatta orientalis Linnæus

[Blatta] orientalis LINNÆUS, 1758, 'Syst. Nat.', 10th Ed., p. 424. America; the East; Russia; Stockholm, Sweden; Finland.

This domiciliary pest, which is virtually cosmopolitan in its distribution, has been definitely recorded from the West Indies in but three instances. These are: from Jamaica, by Sells in 1842; from Guadeloupe, by Lherminier in 1837; from the "Antilles" by Saussure and Zehntner in 1893. No material from the islands has been examined by the authors.

Periplaneta¹ americana (Linnæus)

[Blatta] americana LINNÆUS, 1758, 'Syst. Nat.', 10th Ed., p. 424. America.

JAMAICA.—Kingston, St. Andrew Parish, X, 24, 1913, (M. Hebard; in hotel larder), 1 ♂, [Hebard Cln.].

HISPANIOLA.—Port-au-Prince, Haiti, 2 ♂, [Paris Museum]; XII, 22-31, 1921, I, 1-8, 15-23, 1922, II, 19-28, 1922, (F. E. Watson; chiefly at light), 3 ♂, 1 ♀, 2 immature individuals. Aux Cayes, Haiti, March 15-20, 1922, (F. E. Watson; in hotel), 1 ♀. Puerto Plata, Dominican Republic, V, 7-8, VII, 6, 1915, (F. E. Watson; in house and on steamer after leaving Puerto Plata), 1 ♂, 1 ♀. Sanchez, Dominican Republic, V, 17-21, 28-31, 1915, (F. E. Watson; in hotel), 3 ♂. Santo Domingo City, Dominican Republic, VII, 1920, (Marcus Farley), 1 ♂, [A. N. S. P.].

¹For the characters and relationship of the West Indian species of *Periplaneta* see Hebard, 1917, Mem. Amer. Entom. Soc., No. 2, pp. 14-15, 20, 177-191, Pl. vii, figs. 3-24.

MONA ISLAND.—Playa Sardinera, II, 21–26, 1914, (Lutz; at light), 1 ♀.

PORTO RICO.—Toa-Baja, Department of San Juan, 1915, (G. Garb), 2 ♂, 1 ♀. [Cornell Univ.]. Mayaguez, Department of Mayaguez, VI, 21–23, 1915, 1 ♂. Adjuntas, Department of Aguadilla, VI, 8–13, 1915, 1 ♀.

BARBUDA.—X, 21, 1911, 1 ♂, [A. N. S. P.].

This widely distributed and familiar domiciliary species has, in the past, been recorded from the following localities in the West Indies: Bahamas (Rehn); Cuba (Guérin, Bolivar and Gundlach); Nuevo Gerona, Isle of Pines (Rehn, Holland and Kahl); Los Indios, Isle of Pines (Holland and Kahl); San Domingo (Beauvois, Walker); Jamaica (Browne, Rehn); Porto Rico (Gundlach); Luquillo, Porto Rico (Rehn); St. Thomas, Virgin Islands (Shelford); Antigua (Stoner); Guadeloupe (Lherminier); Barbados (Rehn, Caudell). Gundlach considered the species to be noxious and annoying in Cuba, which is true of it in most of tropical America.

***Periplaneta brunnea* Burmeister**

Periplaneta brunnea BURMEISTER, 1838, 'Handb. der Entom.,' II, Abth. II, pt. 1, p. 503. Chile; Demerara.

CUBA.—Havana, 1 ♀, [Paris Museum]. Baños de Ciego Mantera, Santa Clara Province, V, 5, 1918, 1 ♂.

HISPANIOLA.—Port-au-Prince, Haiti, 2 ♂, 9 ♀, 7 immature specimens, [Paris Museum]. Sanchez, Dominican Republic, V, 11–16, 1915, (F. E. Watson; in hotel), 1 ♀.

JAMAICA.—Kingston, St. Andrew Parish, X, 24, 1913, (M. Hebard; in hotel larders), 1 ♂, 2 ♀, [Hebard Cln.]. Constant Spring, near Kingston, elevation about 650 feet, I, 4–24, 1920, (H. E. Machado), 1 ♂. Montego Bay, St. James Parish, X, 28, 1913, (M. Hebard; in kitchen), 1 ♀, [Hebard Cln.].

BARBADOS.—No exact locality, 1 ♀, [U. S. N. M.].

This species recently has been figured and discussed in detail by Hebard.¹ It is more restricted in its general range than *P. americana*, but occurs virtually throughout the tropics. The only previous records of the insect from the West Indies are those of its occurrence on Culebra Island² and Barbados,³ while Sein,⁴ without details, includes it as a Porto Rican insect.

¹1917, Mem. Amer. Entom. Soc., No. 2, pp. 182–185, Pl. VII, figs. 12–16.

²Rehn, 1910, Bull. Amer. Mus. Nat. Hist., XXVIII, p. 75.

³Caudell, 1922, Univ. of Iowa Studies in Nat. Hist., X, No. 1, p. 22.

⁴1923, Circ. No. 64, Dept. Agric. y Trabajo, Porto Rico, p. 6.

Periplaneta australasiæ (Fabricius)

[*Blatta*] *australasiæ* FABRICIUS, 1775, 'Syst. Entom.,' p. 271. "In nave e mare Pacifico et regionibus incognitis revertente."

BAHAMAS.—Nassau, New Providence, 1♂, [U. S. N. M.]; XI, 10, 1912, 1 immature (damaged).

CUBA.—Los Caños, Guantanamo, Oriente Province, V, 25, 1914, (C. T. Ramsden), 2 immature ♀, [A. N. S. P.].

HISPANIOLA.—La Moriniere, Haiti, III, 1–5, 1922, (F. E. Watson; at light), 1 immature ♀. Port-au-Prince, Haiti, I, 15–23, 1922, (F. E. Watson; at light), 1 ♀. Santiago [de los Caballeros], Province of Santiago, Dominican Republic, XI, 25, 1918, (H. B. Sherman), 1♂, [Mus. of Zoology, Univ. of Michigan]. Moca, Province of Espaillat, II, 22, 1922, (E. Kaempfer), 1♂, [A. N. S. P.]. Sanchez, Province of Samaná, Dominican Republic, V, 11–31, VI, 3–6, 1915, (F. E. Watson), 2♂, 1 ♀, 1 immature ♀.

JAMAICA.—Kingston, St. Andrew Parish, II, 28, 1911, (Grossbeck), 1 very immature specimen: X, 24, 1913, (M. Hebard; in hotel larders), 2♂, 1 immature ♀, [Hebard Cln.]. Pleasant Hill, Blue Mountains, elevation 3660 feet, VII, 27, and 30, 1923, (Rehn; in house at night), 3♂, [A. N. S. P.]. Bath, St. Thomas Parish, elevation about 250 feet, I, 30–31, 1920, 1 immature individual. Stony Hill, St. Andrew Parish, X, 25, 1913, (M. Hebard), 1♂, [Hebard Cln.]. Grange Lane, St. Catherine Parish, X, 25, 1913, (M. Hebard; under bark of a dead tree), 1 ♀, 1 very immature specimen, [Hebard Cln.]. Montego Bay, St. James Parish, III, 14, 1911, (Grossbeck; under bases of leaves of cocoanut palms), 2 ♀; X, 28, 1913, (M. Hebard; in kitchen), 2 ♀, 1 immature ♀, [Hebard Cln.]. Mandeville, Manchester Parish, elevation 2100 feet, XI, 20, 26–28, 1919, I, 6–7, 1920, (F. E. Watson), 3 ♀.

PORTO RICO.—Ensenada, Department of Aguadilla, VI, 14–19, 1915, (F. E. Lutz and A. J. Mutchler), 2♂, 3 ♀, 4 immature ♂, 4 immature ♀. Baños de Coamo, Department of Ponce, VI, 5–7, 1915, (Lutz and Mutchler; hotel porch), 1♂.

ST. KIRTS.—No exact locality, IX, 1914, 1 ♀, [A. N. S. P.].

DOMINICA.—Laudet, VI, 12, 1911, (Lutz), 1 ♀.

This circumtropical species is abundant throughout the West Indies. It is generally domiciliary, but it also occurs in various hiding places out-of-doors.

The West Indian records given by previous authors are as follows: Bahamas (Rehn); Cuba (Saussure, Walker, Bolivar and Gundlach); El Guama and San Diego de los Baños, Pinar del Rio Province, Cuba

(Rehn); Mandeville, Jamaica (Cockerell); Jamaica (Rehn); Porto Rico (Gundlach); Culebra Island (Rehn); St. Thomas, Virgin Islands (Girard); Loango, Virgin Islands (Shelford); Antigua (Stoner); Barbados (Rehn, Caudell); Grenada (Brunner).

One of the Sanchez males and all the Pleasant Hill males have the dark area of the pronotum very extensive, limiting the pale coloration to a narrow cephalic inter-marginal line and a broader caudal section, the lateral pale sections reduced to a mere point on each side, or even completely absent in one Pleasant Hill individual. This is even more decided than that described by Hebard as the maximum condition of this type.¹

Nyctiborinæ

The Nyctiborinæ is a peculiarly tropical American group of cockroaches, many of the members of which possess a covering coat of short golden hairs or "pubescence." It includes some of the most beautifully marked members of the family, also many which are quite somberly colored. One of its genera (*Megaloblatta*) contains the largest known cockroaches, when the area of the organs of flight is considered. No species of the subfamily are found native north of the West Indies and north-central Mexico, while to the southward one species reaches central Argentina (Province of San Luis).

NYCTIBORA Burmeister

This genus, the dominant group of the subfamily, is found in all of the Greater Antilles except Cuba. It is represented by two groups, one composed of nearly or quite uniformly colored, pitch brown forms, with a distinct golden pubescence, of which three species are known from the islands; the other, comprising a single species of bicolored pattern and less marked pubescence, occurring in Hispaniola and Jamaica, is frequently transported in bananas to points in the eastern United States. The absence of the genus from Cuba is puzzling, as it is one of the markedly characteristic types of tropical American Blattidæ, widely distributed in South and Central America and occurring north to north-central Mexico.

KEY TO THE WEST INDIAN SPECIES OF *Nyctibora*

1. Coloration of dorsal surface uniform pitch brown, or at least not sharply contrasted. Lateral borders of pronotum and marginal field of tegmina without pronounced ochre yellow. Supra-anal plate of male with distal margin having two or three emarginations. 2.

¹1917, Mem. Amer. Entom. Soc., No. 2, p. 187, footnote 298.

- Coloration of dorsal surface contrasted. Lateral borders of pronotum and marginal field of tegmina ochre yellow, sharply delimited from the general pitch brown color. Supra-anal plate of male trigonal, margin entire. (Size medium, length of body, ♂ 25.7 to 30.2, ♀ 23.8 to 26.4 mm.) [Hispaniola, Jamaica; Swan Island.].....*lævigata* (Beauvois).
2. Supra-anal plate of male with medio-distal section of margin truncate or emarginate, flanked laterad by pronounced angulate emarginations. 3. Supra-anal plate of male with medio-distal section of margin shallowly emarginate, without trace of flanking lateral angulate emarginations. [Hispaniolâ.]
stygia Walker.
3. Size large (length of body, ♂ 33, ♀ 35 mm.). Tegmina and wings very ample. Pronotum proportionately smaller, with point of greatest width but slightly caudad of middle. Supra-anal plate of male with median section of distal margin arcuate-emarginate in addition to the paired emarginations laterad of median section; angles of flanking emarginations very obtuse. [Jamaica; Virgin Islands.].....*noctivaga* Rehn.
- Size medium (length of body, ♀ 27.2, ♀ 32.2 mm.). Tegmina and wings proportionately shorter. Pronotum proportionately larger, with point of greatest width at caudal third. Supra-anal plate of male with median section of distal margin truncate; angles laterad of flanking emarginations rectangulate. [Porto Rico.].....*lutzi*, new species.

***Nyctibora noctivaga* Rehn**

Nyctibora noctivaga REHN, 1903, Trans. Amer. Entom. Soc., XXIX, p. 3.
♀ (stated in error to be ♂); Machuca, Nicaragua.

This large, uniformly colored Central American species, which has been recorded from localities extending from southern Nicaragua to eastern Panama, apparently has been introduced into the West Indies. It was recorded as *N. mexicana* from Jamaica, without exact locality, by Rehn,¹ and as *noctivaga* by Shelford² from the island of Lqango, near St. Thomas, Virgin Islands. The latter record, however, was based on an immature male individual, and in consequence the specific determination may be open to question. The Jamaican specimens, a male and a female now before us, are both adults, and inseparable from Central American representatives of the species. In size the Jamaican individuals are quite large, as has been shown by Hebard in discussing Panamanian material of the species.³

Hebard⁴ has figured the characteristic supra-anal plate of the male of this species.

¹1903, Trans. Amer. Entom. Soc., XXIX, p. 131.

²1910, Zoolog. Jahrbüch., Suppl. XI, heft 2, p. 105.

³1920, Mem. Amer. Entom. Soc., No. 4, p. 88.

⁴Idem, Pl. v, fig. 4.

Nyctibora lutzii, new species

Plate XVI, Figures 1 and 2

This species is a close relative of *N. brunnea* (Thunberg), from Brazil (for which see Plate XVI, figs. 3 and 4), of which Burmeister's *holosericea* is said by Shelford¹ to be a synonym. The latter author had the Thunberg material before him when the synonymy was established. Burmeister's insect was from Cameta, Brazil, which is at the mouth of the Rio Tocantins, and but a relatively short distance from Peixe Boi, near Pará, a locality represented by a male in the Academy series,² which we have here figured for comparison. We have other material of the same species group which will be discussed at a later date.

From *brunnea*, as represented by the Peixe Boi specimen, the type of *lutzii* differs in being more robust, the pronotum proportionately larger and broader, in the tegmina being shorter and broader, and in details of the male genitalia. The male supra-anal plate has the median process simpler and truncate, not developed as an emarginate structure with diverging lateral angles, while the accessory flanking angles are also less sharply angulate. The key given above under the generic heading will at once show the differential features as far as *noctivaga* is concerned.

TYPE.—Male; Ensenada, near Guanica, Department of Aguadilla, Porto Rico. June 14–19, 1915. (F. E. Lutz; in epiphytes with thin pencil-like leaves.) [American Museum of Natural History.]

Size medium (for the genus); form quite robust, actually shorter and broader than in *brunnea*; vestiture distinct and well indicated but not dense.

Head almost hidden under pronotum; interspace between eyes very narrow, not as broad as width of a single ocellar spot.

Pronotum proportionately large and broad, point of greatest width at caudal third, instead of slightly caudad of middle as in *brunnea*: cephalic section of pronotal margin narrowly arcuate, passing regularly into the diverging, weakly arcuate lateral sections of margin; caudal margin of pronotum faintly obtuse-angulate, nearly truncate, almost no caudo-lateral sections of margin differentiated from caudal margin itself; lateral angles rounded obtuse.

Tegmina relatively short and broad, surpassing apex of abdomen by no more than two-thirds of pronotal length, broad lanceolate, greatest width but faintly less than one-half of length: costal margin regularly arcuate; sutural margin nearly straight; distal section broadly rounded, apex more costal than sutural in position. Wings reaching to apices of tegmina when in repose: anterior field very broad, with apex markedly rounded; radiate field reduced in length and expanse, its length not more than three-fourths of anterior field.

Supra-anal plate (Plate XVI, fig. 1) broadly triangular, with its distal section bearing paired triangular emarginations, flanking laterad a transversely subrectangu-

¹1908, Trans. Entom. Soc. London, 1907, p. 467.

²See Rehn, 1916, Trans. Amer. Entom. Soc., XLII, p. 236.

late section of plate, which section has its free margin sinuato-truncate; angles laterad of paired emarginations subrectangulate; surface of plate thickly covered with numerous long erect chaetiform hairs, producing a pompadour effect on dorsum of plate. Cerci broken. Subgenital plate simple, deplanate, moderately asymmetrical; sinistral styler socket at normally exposed lateral angle of plate, large, thence the margin is strongly arcuate, yet weakly bilobate, to dextral styler socket: which is smaller and situated some distance from dextral extreme of plate: sinistral style large, straight, simple, depressed proximad, acuminate distad; dextral style about two-thirds as long as sinistral style, straight, proportionately stouter than sinistral, more fusiform.

Limbs robust; femoral and tibial spines large. Caudal tarsi with metatarsus subequal to remaining tarsal joints in length.

ALLOTYPE.—Female; Utuado, Department of Arecibo, Porto Rico. January, 1899. (A. Busck.) [United States National Museum.]

The following features are of noteworthy difference from those of the male sex.

Tegmina surpassing apex of abdomen by nearly length of entire pronotum. Supra-anal plate sub-pectate, trigonal, lateral portions of margin straight convergent, distal extremity shallowly and narrowly concave. Cerci rather slender, tapering, surpassing apex of supra-anal plate, joints clearly indicated. Subgenital plate transverse, margin arcuate, medio-distal section of plate impressed.

General color very dark red-brown, in fact almost a blackish maroon, passing indefinitely to bay on the costal margin and more broadly on distal section of the tegmina. Venter with lateral sections of proximal abdominal segments, and indications on the femora and coxae, chestnut. Ocellar spots buff-yellow. Antennae of the general color proximad, mesad passing to brussels brown. Eyes raw umber. Dorsum of abdomen of male, meso- and metanotum burnt sienna, becoming chestnut meso-distad; supra-anal plate of male of general color. Vestiture of dorsum pale golden.

Male (type).—Length of body, 27.2 mm.; length of pronotum, 9; greatest width of pronotum, 12.5; length of tegmen, 24.8; greatest width of tegmen, 11.9.

Female (allotype).—Length of body, 32.2 mm.; length of pronotum, 10.2; greatest width of pronotum, 15.1; length of tegmen, 32; greatest width of tegmen, 13.8.

In addition to the type and allotype we have before us an immature male and an immature female, bearing the same data as the type.

This species is probably a native Porto Rican one, although there is always a possibility of it having been introduced from continental South America. We have, however, very carefully examined all the descriptions of forms of this genus from South and Central America, and can find nothing which would definitely, or even remotely, fit this species.

We take great pleasure in dedicating this species to our friend and colleague Dr. Frank E. Lutz, of The American Museum of Natural History, who has been so largely responsible for securing the collection of West Indian insects now owned by that great institution.

Nyctibora stygia Walker

Plate XV, Figures 1 to 13

Nyctibora stygia WALKER, 1868, 'Catal. Blatt. Brit. Mus.,' p. 148. ♂; St. [Santo] Domingo; Honduras.

HISPANIOLA.—La Serre, Haiti, elevation about 125 feet, III, 3, 1922, (F. E. Watson; under loose dead bark of live "mesquite" tree), 2♂, 3♀, 47 immature individuals of both sexes. La Moriniere, Haiti, elevation about 125 feet, III, 1-5, 1922, (F. E. Watson), 1 immature individual. Port-au-Prince, Haiti, elevation about 300 feet, IV, 5-8, 1922, (W. F. Keeler), 1 immature individual. Maneville, Haiti, elevation about 60 feet, II, 6-10, 1922, (F. E. Watson; at light), 2♂, 2♀, 11 immature individuals.

Before the receipt of the above material the identity of this species had occasioned considerable uncertainty in our minds, and our first impression was that the species from Porto Rico, which we are here describing as *N. lutzi*, was the same as, or closely related to *stygia*. The present species was based on three specimens, two [*a* and *b*] from "St. Domingo" and one [*c*] from "Honduras." These were said to represent the male and female, the latter described as apterous, and from this evidently an immature individual. In an effort to secure some light on the matter an appeal for help was sent to Mr. B. Uvarov, of the Imperial Bureau of Entomology at London, and in due course of time a set of ink sketches of genitalic features of the Walkerian males in the British Museum was received. A request for additional information, accompanied by other sketches for comparison, brought a courteous note with definitely convincing information, showing the marked distinctness of *lutzi* and *stygia*.

Mr. Uvarov sent sketches of the supra-anal plates of the "*b*" male from "St. Domingo" and the "*c*" male from Honduras, from which we presume the "*a*" specimen is the immature individual considered a female by Walker. His sketches show a roughly triangular supra-anal plate with the distal extremity more or less broadly, but rather shallowly, concave, the lateral lobules thereby produced being very broadly rounded, which is exactly what we find in the above recorded Haitian series. Whether the Honduras specimen in its ultimate refinement will prove to be identical with the "St. Domingo" individual remains to be determined, as the sketches by Mr. Uvarov show the distal section of the plate broader and less markedly concave in the Honduras male than in that from "St. Domingo." The two specimens, however, are of the same type, and the differences shown may have no real significance, as intimated by

the present Haitian series. To clarify the situation if specific difference should be found, we here restrict the name *stygia* to the "St. Domingo" male.

The most conclusive difference we find in the present species is in the form of the supra-anal plate, which is not closely approached in any other species known to us. Saussure and Zehntner's *azteca* we know solely from the female sex, but this plate in the male is described as "trapezino-rotundata," while the lack of appreciable pale pronotal markings in *azteca*, as well as the small size of the male given by the describers, would remove it from consideration. *Azteca*, the very different and reduced tegmined *tetrasticta* and the quite distinct, strongly bicolored and smooth *laevigata* agree with *stygia* in having the pulvillus of the caudal metatarsus elongate and equal to one-half of the metatarsal length. There can be no confusion of *stygia* with the very obviously and sharply yellow-bordered forms, such as *sericea* and *laevigata*, the smaller, more slender and more glabrous *glabra*, or the abbreviate tegmined *tetrasticta*.

In general appearance the present species has more resemblance to *N. brunnea* (Thunberg), as we understand it from eastern Brazil, than it has to any other species we have seen. Aside from the genital features *stygia* has a proportionately shorter and broader general form, due chiefly to the shorter tegmina; in the male sex the occipital interocular width is equal to about two-fifths of occipital depth of eye, instead of the eyes being subcontiguous as in *brunnea*; pulvillus of caudal metatarsus is elongate, extending as a long slender prolongation more than half-way to the base of the metatarsus, instead of subtrigonal and less than a third as long as the metatarsus, as in *brunnea*; the pronotum has distinct but not sharply delimited patches of vinaceous-rufous along the lateral margins cephalad of lateral angles, instead of being unicolorous as in *brunnea*.

Representative material of the present species measures as follows:

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Greatest Length of Tegmen	Greatest Width of Tegmen
♂, Maneville, Haiti...	24.4	7.2	10.1	23.2	10 mm.
♂, La Serre, Haiti.....	27.5	8	10.5	24.6	10.6
♀, La Serre, Haiti.....	29	8.2	11.5	25.5	10.6
♀, La Serre, Haiti.....	32.5	8.7	12.2	27	13

The immature material from La Serre alone represents all the instars except the first. As these specimens were taken the same day they demon-

strate that the occurrence of the species as adult extends over at least a large part of the year.

The distinctness of this species from the strikingly colored and formed *lævigata* of the same island and of Jamaica, and from the Porto Rican *lutzi*, shows that at least three phyla of the genus are represented in the West Indies. As to what is really the nearest relative of *stygia* we cannot hazard a suggestion at this time. Our knowledge of the South American forms is still too fragmentary to warrant any attempt to group the species of the genus, although we have carefully analyzed our material representing eleven species of *Nyctibora*.

***Nyctibora lævigata* (Beauvois)**

Plate XVI, Figure 5

[*Blatta*] *ægyptiaca* DRURY, 1773, 'Ill. Nat. Hist. Exot. Ins.,' II, p. 67, Pl. xxxvi, fig. 3. ♀; Jamaica. (Not of Linnæus, 1758.)

Blatta lævigata BEAUVOIS, 1805, 'Ins. Rec. Afr. et Amér.,' p. 228, Orth. Pl. IIc, fig. 4. Sex?; "Saint Domingue."

JAMAICA.—Palm Beach, Montego Bay, III, 3, 1911, (Grossbeck; under stones), 1 ♀. Montego Bay, X, 29 and XI, 3, 1913, (M. Hebard; from bromeliads), 3 ♂, 1 ♀, [Hebard Cln.]. Liguanea Plain, near Kingston, VII, 5, 1920, (R. & H; in cracks of dead stump of a mimosaceous tree), 3 ♂, 1 juv. ♂, [Hebard Cln. and A. N. S. P.]. "Port Antonio," (taken from banana steamer "Annetta" at Philadelphia, XII, 6, 1921; C. A. Davis), 1 ♂, 1 ♀, [Hebard Cln.]. Jamaica [no further data], 1 ♂, [A. N. S. P.].

SWAN ISLAND.—IV, 17, 1913, (George Nelson), 1 ♀, [M. C. Z.].

This beautiful and peculiarly West Indian species has had a rather checkered career in taxonomic literature. Although the first species of this genus made known to the scientific world, it remained one of the least known forms until a few years ago. This condition existed in spite of the fact that two clearly recognizable figures of the insect had been published by the year 1805. First reported and figured from Jamaica by Drury, in 1773, and named, described and figured by Beauvois from Hispaniola over a century ago, the name *lævigata* generally has been considered a synonym of the South American *N. sericea* Burmeister, and the localities of both Drury and Beauvois either assumed to be incorrect or ignored. The present authors placed the matter in its proper light some years ago,¹ and there showed *lævigata* to be a distinct and endemic West Indian species, related to *N. sericea*.² Its nearest relative, however, is a

¹1914, Entom. News, XXV, p. 121-123.

²We must retain this specific name instead of the older *limbata* Thunberg (1826), which is preoccupied by *Blatta limbata* Charpentier (1825).

species from southeastern Brazil, *N. fictor* Rehn, which has recently been described.

From *fictor*, *laevigata* at once can be separated by the marginal field of the tegmina being as pale as the lateral and cephalic borders of the pronotum, by the pronotal form being less truly trigonal, and the supra-anal plate of the male transverse trigonal instead of trapezoidal in general outline. With *sericea* these species form a natural group of the bicolored forms of the genus. Burmeister's *sericea* probably will be found to have a very extensive synonymy, as a number of names have been based on apparently specifically identical insects. The much shorter tegmina and wings, heavier pronotum, richer coloration with sericeous "bloom" much sparser and far less evident, and the form of the supra-anal plate of the male will at once distinguish *laevigata* from *sericea*.

The female individual from Montego Bay has a large oötheca protruding from the anal orifice. This is carried with the carina dorsad.

From the series before us it is evident there is, at times, considerable variation in the length of the organs of flight. All of the Jamaican specimens except two, and the Swan Island female, agree in having the tegmina and wings of the same short and broad type, in length less than three times as long as the pronotum. The Jamaican male specimen without exact locality, and the female from "Port Antonio," however, more resemble the South American *N. limbata* in their general outline, as the tegmina are equal to (♀) or slightly more than (♂) three times as long as the pronotum.

MEASUREMENTS OF REPRESENTATIVE INDIVIDUALS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Montego Bay, Jamaica.....	25.7	8.1	11.5	19.6	9.4 mm.
♂, Montego Bay, Jamaica.....	26.3	8.6	12.5	22	10
♂, "Jamaica".....	30.2	8.6	12.2	27.5	11.7
♀, Palm Beach, Monte- go Bay, Jamaica..	26.4	8.3	12.2	20.2	10
♀, Montego Bay, Jamaica.....	25.8	9	13.4	22	10
♀, "Port Antonio," Jamaica.....	30.4	9	13.1	27.5	12.2
♀, Swan Island.....	23.8	8.5	13.2	22.8	10.6

The coloration is uniform in the series, except that in certain specimens the femora and coxæ show more maroon to garnet brown than in others, where the general pitch black ventral color is more solid. The immature individual from the Liguanea Plain, which is in the instar preceding maturity, has the pronotum with a marked lateral and cephalic dull ochraceous-orange border, narrower proportionately than in the adult, and without indication on the mesothoracic lateral margins.

The species is known only from the records given here, the "Jamaica" records of Drury and Walker,¹ the Hispaniola record of Beauvois, and the records of adventives in the eastern United States and Canada given by Rehn and Hebard, Blatchley and Morse. Its occurrence on Swan Island is probably due to accidental introduction from Jamaica. In the latter island it would appear to be well distributed, at least at lower levels, frequenting a variety of suitable hiding places. There it probably occurs adult throughout the year, as our specimens represent early March, July, October and early November.

***Pseudischnoptera lineata* (Olivier)**

Blatta lineata OLIVIER, 1789, 'Encycl. Méthod., Ins.,' IV, p. 317. Sex?; unknown locality.

This species, which has been reported a number of times from Cayenne, was recorded from the Antilles, without further specification, by Saussure.² No additional information on its occurrence in the West Indies is available, and in our opinion it is a Guianan insect, and has no part in the West Indian fauna. The insect is strikingly marked with a pair of longitudinal lines on each tegmina (one costal and a shorter median one), and a similar cephalic and lateral pronotal border, on a brownish black ground. The sole figure of the insect which has been published is that given by Beauvois,³ which, even in spite of its lack of detail, is sufficiently accurate to enable one readily to recognize the species. Hebard has recently shown that *Pseudischnoptera* is a member of the Nyctibori-næ,⁴ and not of the Pseudomopinae, as generally placed.

EPILAMPRINÆ

The Epilamprinæ comprises a very considerable assemblage of genera and species of cockroaches, all tropical or subtropical in distribution and present in both hemispheres. Many peculiar structural modi-

¹As *N. druryi* Serville (1868, Catal. Blatt. Brit. Mus., p. 147).

²1870, Miss. Sci. Mexiq., Rech. Zool., VI, p. 67.

³1805, 'Ins. Rec. Afr. et Amér., Orth. Pl. n. c., fig. 5.

⁴1921, Proc. Acad. Nat. Sci. Phila., 1921, p. 205.

fications are present in the group, the sexes of the same species are frequently very dissimilar, and certain forms are aquatic for at least a portion of their lives. The subfamily is an extremely difficult one to study, as the limitations of a number of the genera are not clearly understood, and the marked sexual dimorphism frequently found adds greatly to the problems encountered. In America the center of maximum differentiation of the group is probably Brazil, and very possibly that portion south of the Amazon, while in the Old World the Oriental region contains the greatest generic and specific diversification of the subfamily.

But few of the members of this group are domiciliary or liable to be transported by commerce, except in fruit. The genus *Leurolestes* is the only member of the subfamily found in the West Indies which can be considered domiciliary.

KEY TO GENERA OF WEST INDIAN EPILAMPRINÆ

1. Caudal metatarsus markedly shorter than remaining tarsal joints (not more than three-fourths as long); ventral margins of same non-spinulose. 2.
Caudal metatarsus longer than, subequal to, or but faintly shorter than remaining tarsal joints; ventral margins of same spinulose. 3.
2. Form patelliform. Pronotum strongly transverse, resembling that of genus *Paratropes*. Tegmina very broad, acute, corneous, without clearly marked anal sulcus or definite humeral trunk on dorsal surface. Tarsal claws equal.
Phoraspis Serville.
Form acute elliptical, less elevated and not patelliform. Pronotum less strongly transverse, epilamproid in type. Tegmina of more normal blattoid type, less acute, coriaceous, with clearly marked anal sulcus and definite humeral trunk on dorsal surface. Tarsal claws appreciably unequal.
Notolampra Saussure.
3. Sexes without marked difference in development of tegmina, these complete, quadrate or subquadrate. 4.
Sexes with marked difference in development of tegmina. Males (unknown in *Epilampra cubensis*) fully alate. 6.
4. Form markedly deplanate. Pronotum with disk distinctly differentiated from deflexed lateral portions; caudal margin arcuato-truncate, not produced mesad. Median and caudal femora with few and very short spines on each ventral margin. *Leurolestes* Rehn and Hebard.
Form not markedly deplanate, generally appreciably convex in dorsal transverse section. Pronotum with disk little, if at all, differentiated from lateral portions, transverse section usually arcuate; caudal margin always produced mesad to same degree. Median and caudal femora with large and regularly placed spines on each ventral margin. 5
5. Tegmina abbreviate, quadrate or subquadrate, no longer than pronotum, leaving most of abdomen exposed (in West Indian species). (General form strongly arcuate in transverse section. Anal sulcus of tegmina barely indicated.)
Audreia Shelford.

- Tegmina and wings fully developed, nearly or quite equalling or surpassing apex of abdomen. (General form of more usual alate blattoid type; pronotum with production of caudal margin distinctly or markedly evident.) [See also section*6 of this key.].....*Epilampra* Burmeister.
6. Female sex with tegmina longer than pronotum, reaching to middle of abdomen. with marginal field very broad. Male sex unknown. (Region of anal sulcus of tegmina lined with black.).....*Epilampra cubensis* Bolivar, Female sex with tegmina reduced to lateral subtrigonal slips, widely separated. shorter than pronotum and not reaching base of abdomen. Wings absent. Male sex fully alate.....7.
7. Cephalic femora with ventro-caudal margin bearing three or more spines in addition to distal one. Male with pronotum large, distinctly cucullate; face with inter-ocular-ocellar region excavate. Female deplanate, strongly rugulose, with an evident elevated dorsal medio-longitudinal carination; pronotum strongly cucullate, projecting cephalad of and completely covering head.....*Homalopteryx* Brunner.
- Cephalic femora with ventro-caudal margin having at most but a single spine in addition to distal one. Male with pronotum of normal epilamproid type; not at all cucullate; face not excavate. Female arcuate in transverse section to but weakly deplanate (*irrorata*), smooth and moderately polished, non-carinulate; pronotum hardly cucullate, not projecting cephalad of and nor completely covering head.....*Calolampra* Saussure.

PHORASPIS Serville

This genus is composed of nearly a score of species of rather small, strongly convex blattids, which have a marked superficial resemblance to beetles of the cassidid section of the Chrysomelidæ, but are of larger size. The species are known from eastern South America and from Central America as far north as central Mexico. Two have been recorded from the West Indies, but we feel that in at least one of these cases (*atomaria*) this was done in error.

Phoraspis atomaria Blanchard

Phoraspis atomaria BLANCHARD, 1837, Annal. Soc. Entom. France, VI, p. 287, Pl. x, figs. 2 and 2a. Sex?; Guadeloupe.

No student has recorded *atomaria* from the West Indies since the original description, while it has been reported from "Brazil" by Brunner. It is a much more rufescent insect than *pantherina*, with its pattern a minute stippling of fuscous, without decided maculations.

Phoraspis pantherina Blanchard

Phoraspis pantherina BLANCHARD, 1837, Annal. Soc. Entom. France, VI, p. 292, Pl. xi, figs. 3 and 3a. Sex?; "Saint Domingue."

No additional information is available concerning this species in the West Indies. Saussure¹ by inference credits it to Guadeloupe, by using the words "Même patrie" for *pantherina* following a description of *atomaria*, but this is probably a lapsus calami. Like *atomaria* this insect has also been recorded from "Brazil." In general coloration it is more ochraceous than *atomaria*, with a tegminal pattern of distinct and irregularly distributed small black specklings, far coarser than the minute stippling of *atomaria*.

NOTOLAMPRA Saussure

The present genus is made up of three species of a more elongate type than those of *Phoraspis*, although the dorsal surface is markedly convex. The assemblage is one of those marking the transition from the more normal epilamprine type to that of the specialized phoraspid offshoot of the subfamily. Of the three species of the genus, two (*gibba* and *punctata*) are known only from Brazil, while the third is the apparently peculiar West Indian *antillarum*.

Notolampra antillarum Shelford

Notolampra antillarum SHELFORD, 1907, Annals and Mag. Nat. Hist., (7) XIX, p. 38. ♀; Trinité, Martinique.

All the information we possess regarding this species is contained in the original description, and nothing is recorded concerning its habits. Shelford considers it is more nearly related to *punctata* than it is to *N. gibba*.

LEUROLESTES Rehn and Hebard

The genus *Leurolestes* is composed of two species of very similar appearance, of depressed form, relatively smooth surface, fully winged in both sexes, and distinctly margined laterad on the pronotum, tegmina and abdomen with pale color.

Both species are largely domiciliary and readily transported by commerce, so that their present day distribution may have been largely brought about through the indirect agency of man. There is a strong probability the genus is a native of the West Indies, and that it has been transported eastward to the Canary and Madeira Islands, westward to Central America and northward to Florida. Its presence in Brazil can readily be explained by transportation from the Madeira Islands, which were and are regularly visited by ships trading between European ports and Brazil, particularly southern Brazil.

¹1864, Mém. Hist. Nat. Mexiq., III, p. 144.

Leurolestes pallidus (Brunner)

N[auphoeta] pallida BRUNNER, 1865, 'Nouv. Syst. Blatt.,' p. 286. ♂; Cuba.

CUBA.—Varadero, north coast, Matanzas Province, (J. W. Ross), 1 ♀, [A. N. S. P.]. Baracoa, Oriente, II, 5, 1915, 1 ♀, [Davis Cln.].

JAMAICA.—Montego Bay, (S. Brown), 1 ♀, [A. N. S. P.]. No exact locality, (S. Brown), 1 ♂, [A. N. S. P.].

PORTO RICO.—Vieques Island, II, 1899, 1 ♂, [U. S. N. M.].

MONTSERRAT.—No exact locality, (H. G. Hubbard), 1 ♂, [U. S. N. M.].

DOMINICA.—Laudet, VI, 11-13, 1911, (Lutz and Miner), 2 ♂, 3 ♀, 1 immat. indiv.

This striking species has been recorded from Cuba by numerous authors from the days of Serville down to the present, usually under the erroneous names of *Blatta lævigata* or *Phaetalia lævigata*.¹ Gundlach² states it lives over all that island, in houses, under lockers, boards, etc. From Hispaniola it was recorded first by Saussure; from Porto Rico at Utuado by Rehn,³ and from Martinique by Serville. The present records are the first from Jamaica, Montserrat and Dominica.

Outside of the West Indies the species is known from southern Florida (Key West and Key Largo), Central America (Mexico, Guatemala), Brazil and the Canary Islands (Teneriffe). There appears every probability that its presence in Florida, Central America, Brazil and the Canaries is due to accidental introduction from the West Indies, which we feel are the original home of the species. From our knowledge of its occurrence at Key West, Florida, where it was found among old burlap bags in a fruit store, its accidental transportation is easily understood.

For a full description of the species, and figures of the same, see Hebard's 'The Blattidæ of North America.'⁴

Leurolestes circumvagans (Burmeister)

N[auphoeta] circumvagans BURMEISTER, 1838, Handb. der Entom., II, Abth. II, pt. 1, p. 508. Santa Catherina, Brazil; Teneriffe, Canary Islands; around the world in ships.

The present species is closely related to *L. pallidus*, differing in certain features of the coloration, particularly the uniform width of the pale borders of the pronotum, and also in the more nearly approximate

¹*Blatta lævigata* Beauvois which is usually cited for this species is, instead, a West Indian *Nyctibora*. See above and Rehn and Hebard, 1914, Entom. News, XXV, pp. 216-217.

²1890, Contrib. Entom. Cubana, IV, p. 316.

³1910, Bull. Amer. Mus. Nat. Hist., XXVIII, p. 73.

⁴1917, Mem. Amer. Entom. Soc., No. 2, pp. 160-163, Pl. vi, figs. 9-10.

eyes. It is known in the West Indies from Hispaniola (whence Brunner recorded it in 1865 as *lævigata*) and Grenada (reported by Brunner in 1893 as *lævigata*). Elsewhere it has been taken in southern Brazil (Santa Catherina), in the Canary Islands (Teneriffe) and the Madeira Group, as well as from ships voyaging around the world, hence the specific name. Although our evidence as to its distribution in the Antilles is very incomplete and unsatisfactory, we believe its original home was Antillean, the same as *L. pallidus*.

Brunner¹ reported this species as the *lævigata* of authors, which latter he described as *pallida*. This accounts for his record references given above as *lævigata*. The figure given by him shows the leading features of the species.

AUDREIA Shelford

The genus *Audreia* is composed of a small number of species described from the tropics and subtropics of both hemispheres, the majority, however, tropical American. The species much resemble certain forms referred to the genus *Epilampra*, but all possess reduced or subquadrate tegmina in both sexes, these subquadrate or distally emarginate in most of the forms.

Audreia has been discussed by Hebard in his 'Blattidæ of Panama,'² and we are not in a position at this time to go more into detail regarding its relationship to *Epilampra*. Until the genus *Epilampra* as a whole is critically studied, and our knowledge of the extent to which brachypterism occurs in that assemblage is more complete, it is unwise to do other than follow Shelford's use of the generic name *Audreia*.³ We can say, however, that the genus *Calolampra*, to which a number of the species now placed in the more recently described *Audreia* were originally referred, is well distinct from *Audreia* of Shelford.

The West Indies possess two species which can logically be assigned to *Audreia*, one from the higher mountains of eastern Cuba, the other from the Blue Mountains of Jamaica. The possibility that these may be members of an ancient relict fauna forces itself upon one, although the converse argument that tegminal reduction has been brought about by adjustment to a peculiar and restricted montane environment cannot be ignored.

¹1865, 'Nouv. Syst. Blatt.,' p. 285, Pl. VII, fig. 33.

²1920, Mem. Amer. Entom. Soc., No. 4, pp. 92-93.

³1910, 'Genera Insectorum, Orth., Blatt., Epilampr.,' p. 11.

KEY TO WEST INDIAN SPECIES OF *Audreia*

Size larger (length of body, ♂, 19 mm.; ♀, 21.5). Pronotum markedly vaulted, appreciably embracing head. Tegmina with distal margin markedly oblique concave-emarginate, sutural margin distinctly shorter than costal margin (not or but little more than half as long). Abdomen with caudo-lateral angles of distal tergites very weakly produced caudad, not spiniform. Palpi more slender, with ultimate and penultimate joints virtually subequal. (Cuba.) . . . *hamiltoni* (Rehn).

Size smaller (length of body, ♂, 13.6 mm.; ♀, 18–18.6). Pronotum more deplanate, in male not at all, and in female but weakly, embracing head. Tegmina more quadrate, distal margin far less oblique, more nearly transverse in direction, sutural margin but little shorter than costal margin (four-fifths as long). Abdomen with caudo-lateral angles of distal tergites distinctly spiniform produced caudad, very decided in male sex. Palpi more robust, with penultimate joint but two-thirds as long as ultimate one. (Jamaica.) . . . *jamaicana*, new species.

***Audreia hamiltoni* (Rehn)**

Plate XV, Figures 8 to 10

Calolampra hamiltoni REHN, 1903, Trans. Amer. Entom. Soc., XXIX, p. 274.
♀; Torquino Peak, Oriente, Cuba, elevation 5800 feet.

The original material of this most interesting Cuban species is now before the authors. The specimen mentioned in the comments of the original description as being very light in color, with the well-marked lyrate pronotal markings, is an adult male, and not a female as there stated. This individual is the only one of the sex known, its noteworthy differences from the female sex being as follows.

Eyes slightly deeper, ventral section slightly more elongate. Supra-anal plate of same form as in female, but with scabrosities of surface of distal section fewer, more regular and more distinct and elevated, distal margin hardly emarginate mesad. Cerci broken. Subgenital plate relatively large, moderately transverse, free margin in general arcuate but weakly asymmetrical; styles very slender, weakly decurved, dextral twice as long as sinistral, dextral style inserted at middle of dextral side of margin, sinistral slightly more distal in relative position, dextral placed in a shallow emargination of the margin, sinistral in an intermarginal depression which does not affect the marginal outline.

Male.—Length of body, 19.2 mm.; length of pronotum, 5.5; greatest width of pronotum, 7.9; length of tegmen, 5; greatest width of tegmen, 5.

The species *hamiltoni* is clearly congeneric with *carinulata* (Saussure) of Central America, the genotype, as selected by Hebard,¹ although it has a number of features of difference. The key given above contains the chief features of difference from the Jamaican species here described.

Nothing is known regarding the occurrence or distribution of this species other than that contained in the original description.

¹Vide *supra*.

***Audreia jamaicana* new species**

Plate XV, Figures 4 to 7

Compared with the Cuban *A. hamiltoni*, the present species is readily separated in both sexes by its smaller size, more deplanate pronotum, which also has the caudo-lateral angles less produced, the more quadrate tegmina, the sutural margin of which is distinctly longer proportionately than in *hamiltoni*, the more deplanate dorsum of the abdomen, the more produced and spiniform caudo-lateral angles of the abdominal tergites, and the more robust palpi, the penultimate joint of which is but two-thirds as long as the ultimate one, instead of these being nearly subequal as in *hamiltoni*. The supra-anal plate of the male is differently sculptured and the subgenital plate of the same sex more trigonal produced than in *hamiltoni*.

When compared with *A. carinulata* (Saussure), the genotype, of which a female from Tablazo, Costa Rica is before us, the present species is seen to differ chiefly in the shape of the tegmina, particularly of the distal and sutural margins, in the more evident venation of the same, the spiniform angles of the abdominal tergites, the longer cerci and in details of the coloration.

TYPE.—Male; between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. Elevation, 4650 feet, July 24, 1923. (Rehn; from epiphytic bromeliad in open mountain forest.) [Academy of Natural Sciences of Philadelphia, Type No. 5421.]

Size relatively small; form elliptical, moderately depressed, dorsum of abdomen appreciably deplanate; surface of abdomen and limbs polished, of head, pronotum and tegmina dully polished.

Head short and broad, greatest width across eyes subequal to depth of same, broadly sub-cordiform in outline; occipital interspace between eyes very broad, slightly greater than half of entire width of head across eyes, faintly broader than that between antennal scrobes. Palpi with ultimate joint sublanceolate when seen in lateral aspect, greatest depth contained two and one-half times in greatest length, apex acute; penultimate joint about two-thirds as long as ultimate joint, broadly infundibuliform, its depth at apex little less than greatest depth of ultimate joint, appreciably arcuate at proximal extremity.

Pronotum nearly semicircular in outline, greatest length contained faintly more than one and one-half times in greatest (caudal) width of same: lateral and cephalic margins regularly, strongly and uniformly arcuate except for a slight supra-cephalic flattening; caudal margin transverse, truncate laterad, very weakly and very bluntly obtuse-angulate produced mesad; caudo-lateral angles very narrowly rounded rect-angulate: in transverse section the pronotum is moderately arcuate, weakly flattened mesad for the greater portion of its width, disk bearing mesad a pair of closely placed subcircular depressions.

Tegmina in general form subquadrate, slightly longer than broad, their length faintly greater than that of pronotum, attingent and faintly overlapping mesad,

apices reaching to lateral bases of second tergite, greatest length at lateral third, point of greatest width at distal third: costal margin but briefly longer than sutural margin, passing from nearly straight proximad to strongly arcuate in distal half; sutural margin very faintly arcuate; distal margin weakly oblique, nearly subtruncate, shallowly concave; disto-sutural angle rounded rectangulate; disto-costal angle broadly rounded and constituting tegminal apex: venation well indicated, weakly elevated; marginal field broad, constituting slightly more than one-third of tegminal width at proximal fourth of tegmen, less defined distad; anal field without marked delimiting anal sulcus, but form and shape evident, large, comprising half of tegminal width and five-sixths of length along sutural margin. Wings rudimentary, completely hidden under tegmina.

Abdomen with caudo-lateral margins of tergites acute and produced caudad, becoming spiniform distad; surface of tergites with regularly disposed type of longitudinal welt-like ridges on distal half of each segment, as usual in many epilamprine forms, remainder of same surface with many small papilliform elevations. Supra-anal plate semicircular in outline with a shallow median V-emargination; surface of plate largely concave. Cerci robust, tapering, apex narrowed, extending caudad to faintly distad of margin of supra-anal plate, subdeplanate. Subgenital plate not extending caudad of supra-anal plate, asymmetrical, free margins roughly arcuate, in general rounding from sinistral base to a point dextrad of middle of plate, but with several flattenings of the general arcuation, from above mentioned point to base of dextral style margin is obliquely subtruncate, thence obliquely truncate to dextral base; styles simple, styliform and subequal except that dextral is faintly the longer, both failing to reach as far distad as extremity of subgenital plate.

Limbs as a whole relatively short and robust, ventral margins of femora strongly spined. Cephalic femora with ventro-cephalic margin with three to four large proximal spines, succeeded by a series of rather sparse, short spinules and the distal group of two spines of very unequal size, distal more than twice as long as other. Caudal tarsi with metatarsus slightly longer than remaining tarsal joints together, biserially spinulose ventrad; pulvilli present on all joints; arolia well developed.

ALLOTYPE.—Female; same data as type. [Academy of Natural Sciences of Philadelphia.]

Agreeing with the above description of the male sex (type) except in the following noteworthy respects.

Size larger (i. e., larger than *carinulata* and smaller than *hamiltoni* and *gatunæ*); form less depressed; less contrast in surface polish of pronotum, tegmina and dorsum of abdomen.

Pronotum with greatest length contained slightly less than one and one-half times in greatest (caudal) width of same: disk of pronotum with a few scattered, paired punctiform indentations.

Tegmina with length faintly less than greatest width (or subequal as in paratype female): costal margin straighter, less arcuate distad but apex as fully rounded and as pronounced as in male: anal field no more decided than in male but clearly traceable distad as far as disto-sutural angle.

Surface of abdominal tergites with welt-like ridges somewhat less pronounced, remainder of surface with papilliform elevations less evident, these largely represented by coloration features. Supra-anal plate with surface much less excavate than in male. Cerci not quite reaching as far distad as apex of supra-anal plate. Subgen-

ital plate with portion of margin between infra-cercal emarginations broadly arcuate, entire, failing to reach as far caudad as supra-anal plate; infra-cercal emarginations shallow but distinctly marked.

Underlying base color cinnamon-buff (females) to pinkish cinnamon (male), overlaid, very heavily and quite solidly in the male, less solidly and more of the usual atomaceous epilamprine character in the female, with a pattern of blackish fuscous and walnut brown. Face solidly blackish fuscous from occipital interspace to middle of clypeus; dorsum of occiput pale with a variable amount of dark stippling; eyes tawny to russet; antennæ dresden brown to prout's brown. Pronotum in male with disk rather solidly blackish fuscous, laterad and cephalad the dark pattern weaker and sparser, the punctulæ more walnut brown; in the female the whole pronotum is rather evenly atomaceous punctulate with walnut brown, with faint indications of a lyrate pattern made up of larger dots, which are somewhat darker, a relatively regular intermarginal girdle of spaced larger walnut brown punctæ is also indicated. Tegmina of male with discoidal and anal fields resembling in coloration the disk of pronotum, marginal field much as lateral sections of pronotum; tegmina of female with regularly stippled atomaceous pattern of walnut brown punctæ, some of those in the region of the humeral trunk larger and blackish fuscous, in the anal field the punctæ show a disposition to follow veins. Dorsum of abdomen densely punctulate with blackish fuscous to prout's brown, in the male so densely that the color is almost solidly blackish brown; in the females less heavily, with a weak pale median bar indicated by weaker character of overlying dark pattern, in the female the welt-like ridges are russet to cinnamon-brown. Cerci ochraceous-buff very narrowly tipped with prout's brown. Limbs and coxæ cinnamon-buff to orange-cinnamon, punctulate with prout's brown to blackish fuscous; coxæ blotched proximo-cephalad with same and cephalic femora occasionally (male) lineate dorsad and cephalad with blackish fuscous. Venter of male abdomen virtually solid blackish fuscous; of female proximad patterned much as dorsum of abdomen, distad becoming more densely punctulate until subgenital plate is solidly blackish fuscous; styles of male of general color.

The male (type) is of a very intensive type of coloration, so that evident colorational features found in the females are there often obscured or but faintly apparent.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, type.....	13.6	4	6.1	4.3	3.7 mm.
♀, allotype.....	18	5	7	4.3	4.8
♀, paratype.....	18.6	4.8	7	4.5	4.5

In addition to the type and allotype we have before us a paratypic female taken between 4400 and 4700 feet in the same area as the type, on July 22, 1924. The type and allotype were shaken from bromeliads growing low down on several trees in rather open forest at 4650 feet elevation, near the junction of the Clydesdale-Cinchona and Pleasant

Hill trails. The paratypic female was taken from under dead wood in denser forest. The sole apparent noteworthy difference between the allotype and the paratypic female is that the papilliform sculpture of the abdominal tergites is more evident in the paratype and more like the condition found in the male sex.

In certain respects the present species stands between the genotypic species, *carinulata* of Central America, and the Cuban *hamiltoni*, combining certain characters of each. The tegminal features are virtually intermediate between those found in these two species, not only in the shape but also in the development and emphasis of the venation. That this corresponds to their respective geographic positions may be much more than mere coincidence.

EPILAMPRA Burmeister

The genus *Epilampra* is one of those assemblages which have developed within the tropics of both hemispheres a vast number of species, often quite distinct, again closely related and difficult to distinguish. With a general type of coloration the fluctuations of which make definite and exact characterization difficult, if not at times virtually impossible, it combines a uniformity of development in numerous other features, that in general in the family are sufficiently varied to prove of value to the systematic student. To add to the uncertainty of a situation difficult at best, we find many of the published descriptions almost valueless to aid in the recognition of these forms. As a whole the genus is one of the most difficult, obscure and generally unsatisfactory to study in the entire Blattidæ.

We have given very considerable time to the study of the West Indian members of the genus, and, everything considered, feel the results have been satisfactory. All of the peculiarly West Indian species have been recognized by us but one. Two South American species have been recorded from the West Indies which we have not seen from that region, and in at least one of the cases the identification has been found to be erroneous. The two species are *E. conspersa* Burmeister and *E. cribrosa* of the same author. The first was recorded by Scott, on Shelford's determination, from Dominica,¹ while *cribrosa* was reported by Caudell from the same island.² As we are showing below under *abdomen-nigrum* the record of *cribrosa* relates to the former species, the material upon

¹1912, Ann. and Mag. Nat. Hist., (8) X, p. 430 [Mountains behind Rôseau, Dominica; elevation over 1000 feet, in *Tillandsia* in virgin forest].

²1914, Proc. U. S. Nat. Mus., XLVII, p. 491.

which the record was based having been recently examined by the present authors.

The West Indian forms tentatively can be assigned to the following species groups.

Cubensis Group, comprising *cubensis* Bolivar only.

Mexicana Group, containing *insularis* and *tainana*, new species.

Abdomen-nigrum Group, containing *mona*, new species, and *abdomen-nigrum* (DeGeer).

Burmeisteri Group, composed of *gundlachi*, new species, *burmeisteri* (Guérin), *wheeleri*

Rehn, *haitensis*, new species, and *sabulosa* Walker.

Grisea Group, containing *quisqueiana*, new species.

The *Mexicana* and *Grisea* Groups are known to contain forms other than those here treated, and probably this will be found to be true of the other assemblages when our knowledge of the South American forms is more complete and connected. As found in the West Indies the *Cubensis* and *Mexicana* Groups occur only in Cuba, although the latter is widely distributed continentally. The *Abdomen-nigrum* Group ranges from Jamaica, Mona Island and Porto Rico through the Lesser Antilles to northern South America and Amazonia, but is unknown from Cuba and Hispaniola, although occurring northward on the Central American mainland as far as southern Mexico. The *Burmeisteri* Group is apparently restricted to the Greater Antilles, while the *Grisea* Group occurs in Hispaniola. The *Grisea* Group is, however, one of wide distribution in northern South America.

KEY TO THE WEST INDIAN SPECIES OF *Epilampra*¹

1. Tegmina not surpassing apex of abdomen. 2.
 Tegmina surpassing apex of abdomen. 4.
2. Tegmina of female abbreviate, reaching only to middle of abdomen; anal sulcus of tegmina with a black line. (Head black.) [Cuba.] . . . *cubensis* Bolivar.
 Tegmina of female more elongate, their apices reaching to between middle and apex of abdomen²; anal sulcus of tegmina without a black line. 3.
3. Size smaller (length of body, ♀, 18.5–20 mm.). Face below antennæ with two transverse markings of fuscous. Pattern of pronotum and tegmina strongly contrasted. Abdomen with pronounced pale lateral margins on both dorsal and ventral surfaces. Female supra-anal plate very shallowly emarginate mesad. [Mona Island.] *mona*, new species.
 Size larger (length of body, ♂, 17.5–23.2 mm., ♀, 22–29). Face below antennæ with dark punctulæ but no decided transverse bars. Pattern of pronotum and tegmina never strongly contrasted. Abdomen without contrasted

¹This table is entirely artificial in construction and is based solely on the species which are unquestionably West Indian in occurrence.

²*Abdomen-nigrum* by variation in Mexico and South America reaches a point where it might be confused with *cubensis* on account of tegminal length, but the color features given for *cubensis* are not possessed by the first-mentioned species.

- pale lateral margins. Female supra-anal plate quite deeply and sharply divided mesad. [Jamaica, Porto Rico, Lesser Antilles and much of continental tropical America.].....*abdomen-nigrum* (DeGeer).
4. Humeral trunk of tegmina with a solid lining of blackish or dark brown for at least proximal fourth of tegmen.....5.
 Humeral trunk of tegmina without a solid lining of blackish or dark brown, infuscation of this region always in the form of patches or punctæ.....9.
5. Marginal field of tegmina hardly contrasted in base color with remainder of tegmina; dark punctæ of tegmina distinct, isolated and not merging into an atomaceous punctulation. (Size medium. Disk of pronotum with no distinct lyrate pattern. Subgenital plate of male with a distinct circular dark discal spot.) [Cuba and Jamaica.].....*gundlachi*, new species.
 Marginal field of tegmina sharply or appreciably contrasted in base color with remainder of tegmina; dark punctæ of tegmina relatively hidden in a general mantling atomaceous punctulation, producing a decided "pepper and salt" appearance.....6.
6. Form more slender, size smaller (length of body, ♂, 18 mm., ♀, 18-19.5). Lyrate pattern of pronotum always weak or hardly indicated. Pale base color of marginal field of tegmina of great extent, covering scapular field as well. Dark lining of humeral trunk of tegmina continued solidly or by decided indications to distad of middle of tegmen. (Abdomen without dark marginal blotches; male subgenital plate without dark discal spot.) [Cuba.].....*burmeisteri* (Guérin).
 Form more robust, size larger (length of body, ♂, 19-21.5 mm., ♀, 20-23.8). Lyrate pattern of pronotum distinct, though not always strikingly indicated. Pale base color of marginal field of tegmina limited to that field, or gradually blending into basal tone of scapular field. Dark lining of humeral trunk of tegmina not indicated at all distad of middle of tegmen.....7.
7. Lateral margin of pronotum and costal margin of tegmina not lined with blackish fuscous. Lateral section of pronotum and marginal field of tegmina having pale base color little contrasted with base tone of pronotum and discoidal field of tegmina.....8.
 Lateral margin of pronotum and costal margin of tegmina lined with blackish fuscous. Lateral section of pronotum and marginal field of tegmina distinctly, though not sharply, contrasted with base tone of pronotal disk and discoidal field of tegmina. (Normally covered portion of right tegmen deep chestnut-brown. Abdomen having dorsum with decided dark lateral margins.) [Hispaniola.].....*haitensis*, new species.
8. Form more robust, pronotum heavier and broader proportionately. Interocular space in female appreciably greater than occipital depth of eye; in male slightly greater than same. Tegmina with costal margin more regularly arcuate; punctulations of tegmina more reddish; lining of humeral trunk covering but one-third of tegminal length. [Porto Rico.]
wheeleri Rehn.
 Form more slender, pronotum proportionately smaller. Interocular space in female subequal to occipital depth of eye; in male equal to two-thirds of same. Tegmina with costal margin less arcuate and more sigmoid; punc-

- tulations of tegmina more fuscous; lining of humeral trunk covering approximately one-half of tegminal length. [Hispaniola.] *sabulosa* Walker.
9. Size larger (length of body, ♀, 24–26 mm.). Interocular region and much of face solidly blackish fuscous. Dorsum of abdomen strikingly marked with fuscous. 10.
- Size smaller (length of body, ♀, 20–22.5 mm.). Interocular region only in part and not solidly blackish fuscous. Dorsum of abdomen with no marked fuscous pattern. [Hispaniola.] *quisqueiana*, new species.
10. Dark pattern dense and greatly mantling the pale base color, particularly in discoidal and anal fields of tegmina. Face with lower portion largely pale. Disk of pronotum with lyrate pattern and punctulations combining to nearly obscure pale base color. Ulnar rami of wings more longitudinally directed. Venter of abdomen heavily punctulate with blackish fuscous. [Cuba.] *tainana*, new species.
- Dark pattern sparse, far less evident and not mantling pale color. Face with lower portion solidly dark with interocular region. Ulnar rami of wings more transverse in direction. Venter of abdomen largely solid blackish fuscous with very narrow pale lateral margins. [Cuba.] . *insularis* Bolivar.

***Epilampra cubensis* Bolivar**

[Epilampra] cubensis BOLIVAR, 1888, Mém. Soc. Zool. France, I, p. 127. ♀; Cuba.

Epilampra cubensis GUNDLACH, 1890, 'Contrib. Entom. Cubana,' IV, p. 308. Mata, east of Baracoa, Oriente, Cuba.

This species we have not seen, and there exists a strong possibility it is a member of the genus *Audreia*, although its reference to the genus *Epilampra*, as now understood, may be as well justified today as when Bolivar described the insect.

The distinctive feature of the species seems to be the possession of abbreviate tegmina, which reach only to the middle of the abdomen, have the marginal field very broad, and in shape are attenuate toward the apex. The coloration is castaneous, with the head black, while the tegmina have a black line close to the anal vein. The length of the body is 20 millimeters, of pronotum, 6.5, of tegmen, 10.

No other West Indian species of the genus *Epilampra* known can well be confused with *cubensis*, and the tegminal form alone will at once distinguish it from *Audreia hamiltoni* and *jamaicana*, the known West Indian members of that genus.

***Epilampra insularis* Bolivar**

Plate XVI, Figures 6 to 8

[Epilampra mexicana] var. *insularis* BOLIVAR, 1888, Mém. Soc. Zool. France, I, p. 128. ♀; Cuba.

Epilampra mexicana [var. *insularis*] GUNDLACH, 1890, 'Contrib. Entom. Cubana,' IV, p. 309. Bayamo and Yateras, Oriente, Cuba.

CUBA.—El Alto de la Union, Monte Libano, near Guantanamo, Oriente Province, V, 18, 1913, (C. T. Ramsden; in woods), 1 ♀, [A. N. S. P.].

This species is extremely close to the succeeding one, which might be confused with it. The differential features of the species are discussed under *tainana*. Bolivar mentions a variety of *insularis*, which he characterizes, as, "Variat supra cum elytris ferruginea, punctis sanguinis subobsoletis variegata." The present specimen is of this phase, and no representative of the somewhat darker, less strongly rufescent form of the species has been seen by us.

Bolivar originally referred this insect to *E. mexicana* with the varietal designation of *insularis*, but frankly admitted that *mexicana* was unknown to him except from the literature. We now have before us material of *mexicana* from Mexico and Central America, and we find that, though closely related, *insularis* and *mexicana* are quite distinct and may be distinguished by the smaller size of *insularis*, its more solidly infusate face, greater interocular space in the female sex, shallower median incision of the female supra-anal plate, which also has the lateral arcuations more pronounced, the solid infuscation of most of the distal and lateral sections of the venter of the abdomen, and the more slender and attenuate tarsi, particularly the caudal pair, which also have the distal half or more of each article solidly infusate, instead of but a narrow distal section as in *mexicana*.

In all probability *insularis* is restricted in its distribution to areas of primæval forest in eastern Cuba, where it occurs in company with *tainana*, described below.

***Epilampra tainana*,¹ new species**

Plate XVI, Figures 9 to 11

An intensively patterned and very dark species, which is comparable solely among the West Indian species with *E. insularis*, occurring in the same region. Of the other tropical American species which we have before us it bears closest resemblance to *E. columbiana* and *mexicana* Saussure and *stigmosa* Giglio-Tos, while there is quite a suggestion of the Brazilian *agathina* Saussure.

From *E. insularis* the new species may be distinguished by the far heavier and denser dark punctulation, which is so heavy in the anal and discoidal fields of the tegmina as to almost obscure the paler base color,

¹After the native Tainan Arawak Indian stock of the Greater Antilles.

the piceous of the face less solid and broken into more or less distinct transverse bars ventrad of the eyes, the more longitudinally directed ulnar rami of the wings, the more elongate femora, particularly the cephalic pair, and by the venter of the abdomen not being solidly piceous anywhere, but punctulate and marmorate with the same. From *columbiana*, *tainana* can at once be distinguished by the more longitudinal and less transverse pronotum, the broader interspace between the eyes (female), the more regularly distributed punctulate pattern of the tegmina, which in *columbiana* does not strongly intensify and mass in the anal and discoidal fields of the tegmina but remains more sharply defined, in the more numerous ulnar rami of the wings, and the presence of a piceous punctulate pattern on the abdominal venter. From *stigmosa* the present species is separable by the same features as from *columbiana*, except that the pronotal form shows less difference and the ventral coloration is not as strikingly different as in *columbiana*, but in addition *tainana* is larger, with the subgenital plate less broadly rounded and more rostrate mesad, and the caudal tarsi are longer. From *mexicana*, *tainana* at once can be distinguished by its darker coloration, slightly smaller size, facial coloration and other features.

TYPE.—Female; "El Peru," Monte Libano, near Guantanamo, Oriente Province, Cuba. April 13, 1913. (Charles T. Ramsden.) [Academy of Natural Sciences of Philadelphia, Type No. 5380.]

Size large; form robust.

Head with interspace between eyes broad, slightly greater than that between ocelli.

Pronotum moderately transverse, greatest length contained one and three-tenths times in greatest width; lateral sections rather decidedly declivent; surface of disk with one pair of median and one of postmedian depressions: cephalic margin relatively short, arcuato-truncate, passing into the arcuato-truncate and thickened lateral margins; caudo-lateral angles rounded sub-rectangulate; caudal margin moderately produced and narrowly rounded mesad.

Tegmina surpassing apex of abdomen by about pronotal length, very ample: costal margin moderately arcuate to middle of tegmen; apex well rounded rectangulate, slightly more costal than sutural in position: marginal field relatively broad; anal field elongate pyriform, apex reaching to two-fifths of total length of tegmen; rami of veins and nervures in all fields numerous and closely placed. Wings with ulnar vein bearing twenty-four rami, these diverging at an angle slightly more acute than 45° , becoming even more longitudinal in distal third.

Abdominal tergites with disto-lateral angles produced into distinct aculeate spines. Supra-anal plate produced, proximal width but little greater than length, semi-elliptical in outline, lateral margins arcuate convergent, meso-distad distinctly acute-emarginate, each lateral margin regularly arcuate over the paired lobations to the median emargination. Cerci slightly surpassing apex of supra-anal plate, tapering. Subgenital plate large, broad, greatest proximal width nearly twice as great as median.

length of same; median section of plate subrostrate and feebly compressed; intercercal section of margin rounded rectangulate.

Limbs moderately robust. Cephalic femora moderately slender, greatest width contained about four times in greatest length of same; ventro-cephalic margin with four large proximal and two large distal spines, intervening series subpiliform; ventro-caudal margin with four large spaced spines, one of which is distal. Median and caudal femora with ventral margins with large spines. Caudal tarsi somewhat less than three-fourths as long as caudal tibiæ, slender; caudal metatarsi biserially spinulose ventrad, pulvilli distinct, arolia pronounced; tarsal claws equal, margins simple.

Base color cream-buff to cinnamon-buff, heavily mantled under a dense pattern of chestnut-brown to fuscous, which is at times so solid as to almost or quite obscure the pale base color. The pattern as described in the following lines refers to the mantling color. Head with occiput largely dark, occasionally (type) showing pale mesad; interocular region solidly dark, interocellar region pale mesad, infra-ocellar sections dark, ventral section of face largely dark transversely, dorsal section of clypeus transversely dark, paler areas of face punctulate with dark; eyes blackish fuscous; antennæ almost or entirely dark. Pronotum with dark lyrate pattern indicated but merging into a general dark and dense atomaceous punctulate pattern, which leaves a pre-median series of six transversely disposed pale spots, a median pale pair and a post-median series of three; laterad the punctulate pattern is less dense; lateral margins lined with dark. Tegmina completely covered with a dark punctulate pattern similar to that of the pronotum, less dense in the marginal and scapular fields, more dense in the anal and discoidal fields, becoming almost solid in the normally covered sections of these areas of the dextral tegmen, the punctulate character of the pattern becoming more blotchy and marmorate distad; punctulations of scapular field disposed along the rami and particularly marked at their junction with the costal margin; humeral trunk without solid lining but covered with marmorate punctulations. Abdomen with dorsum bearing a transverse dark pattern, caused by proximal and distal dark barring of each segment, these bars becoming subconfluent on distal segments, pale areas dark punctulate; supra-anal plate dark proximad, becoming pale distad, with that section distinctly dark punctulate, two pale areas present in dark proximal section; cerci pale with segments transversely dark barred; venter of abdomen thickly dark punctulate, the punctulations more closely placed laterad than elsewhere, except for usual lateral series of pale areas; subgenital plate with much of its surface solidly dark, this variable individually but most apparent on each side of rostrate section of subgenital plate. Coxæ, femora and tibiæ to a variable degree, but always a very evident one, punctulate with dark; femora lined on margins and distad, and tibiæ washed on margins and distad with dark, sculpture lines on cephalic and caudal faces finely lined with dark; tibial spines ferruginous, dark tipped; tarsi with joints dark distad, by variation these almost entirely dark.

In addition to the type we have before us a paratypic female bearing the same data as the type, and another paratypic female labelled, "La Victoria," Monte Toro, near Guantanamo, Oriente Province, Cuba, April 30, 1912, (C. T. Ramsden), both in the collection of the Academy of Natural Sciences of Philadelphia. We have also seen two immature females in the instar preceding maturity, which were taken at

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♀, "El Peru," Monte Libano, Cuba, type...	24.5	7.3	9.5	27.5	8.3 mm.
♀, "El Peru," Monte Libano, Cuba, para- type.....	24.6	6.9	8.9	26.4	8
♀, "La Victoria," Monte Toro, Cuba, paratype.....	26	7.7	9.5	28.3	8.8

the same time and same locality as the type; and seven immature individuals, representing both sexes and the two instars preceding maturity, which were taken from under dead leaves, on stream bank on the cafetal "Virginia," Yateras, near Guantanamo, Oriente Province, Cuba, on March 10, 1924, by C. T. Ramsden, and three more immature individuals representing two instars, from Guantanamo, taken June 15, 1924 by the same collector.

***Epilampra mona*, new species**

Plates XVI, Figures 12 and 13; XVII, Figure 1

A very distinctive species, with a fascies quite different from that of any West Indian or other form of the genus known to us. It is, apparently, nearer to *E. abdomen-nigrum* than any other species before us, but it can at once be distinguished by its smaller size, heavily punctate and contrasted pattern, the light tint of the ground color, the depth and extent of the pronotal pattern, the strikingly different and distinctive facial pattern, the very shallow median emargination of the female supra-anal plate, the more slender and less obese abdomen, and the presence of broad and sharply contrasted pale lateral margins of both the dorsal and ventral surfaces of the abdomen. Doubtless when the male sex is known differences in the genital features of that sex will be found.

TYPE.—Female: Playa Sardinera, Mona Island, West Indies. February 24, 1914. (F. E. Lutz; in *Tillandsia uttreulata*.) [New York Academy of Sciences; American Museum of Natural History.]

Size relatively small; form robust.

Head as broad as deep when seen from cephalic aspect, in dorsal view visible cephalad of pronotum for almost entire width of head; interocular space very broad, appreciably greater than interocellar space, equal to one and two-thirds times greatest depth of eye.

Pronotum with greatest length equal to one and one-half times greatest width of same; lateral portions considerably deflexed, but broadly rounding into disk; surface without marked depressions, a group of spaced puncta which have little relation to the color pattern placed mesad and caudad of middle: cephalic margin narrowly subtruncate, broadly rounding into the subarcuate lateral margins; caudo-lateral angles rounded obtuse-angulate; caudal margin moderately produced mesad.

Tegmina reaching apex of supra-anal plate, relatively broad: costal margin regularly arcuate, apex strongly and sharply rounded: marginal field broad; anal field pyriform, anal sulcus joining sutural margin very slightly short of middle of tegmen. Wings reaching to apices of tegmina.

Abdomen relatively broad, tergites with caudo-lateral angles very briefly angulate-produced, hardly at all spiniform. Supra-anal plate transverse, greatest proximal width equal to twice greatest length of same, lateral margins regularly arcuate convergent to the very shallow and wide obtusely-angulate median emargination. Cerci slightly surpassing supra-anal plate in length, subfusiform, acute distad. Subgenital plate large, greatest length contained more than twice in proximal width of same, infra-cercal emargination very shallow and broad, disto-median section of margin regularly arcuate.

Limbs robust for this genus. Cephalic femora with ventro-cephalic margin having four spaced proximal and two distal large spines, margin between with series of minute spinulations, ventro-caudal margin of cephalic femora with four large spaced spines, one distal in position. Ventral margins of median and caudal femora regularly armed with large spines. Caudal tarsi about three-fourths as long as caudal tibiae; caudal metatarsi comprising nearly one-half of entire tarsal length, ventrad biserially spinulose, pulvilli well developed; arolia well developed; tarsal claws equal, margins entire.

Base color light ochraceous-buff, with a faint clay color tendency on pronotal disk, anal and discoidal fields of tegmina and dorsum of abdomen; disk pattern strongly contrasted, blackish fuscous to bay, the latter only on tegmina, and as follows in distribution. Occiput largely clouded with dark, with three narrow longitudinal pale lines; interocular region with four, rather small, transversely disposed solid dark blotches, well separated from occiput; interocellar region with a pair of large, roughly diamond-shaped dark blotches connected mesad and weakly in contact with interocular series, ventrad of ocelli and interocellar region is a transverse bar of dark, narrower mesad than laterad, face immediately dorsad of facio-clypeal suture with a transverse dark marking which mesad is triangularly divided by the pale base color; face with pale base color sparsely dark punctulate: eyes fuscous; antennae heavily washed with dark. Pronotum with a dark atomaceous punctulation, which is more pronounced and denser on the disk, and a dark pattern made up of a heavily indicated lyrate pattern, a premedian group of transversely disposed dark blotches, a similar and heavily indicated infuscation of the caudal margin on the disk, and a general and regularly distributed dark punctulation; lateral margins of pronotum somewhat darkened. Tegmina with humeral trunk heavily infusate, anal and discoidal fields with a heavily indicated and dense dark pattern of punctations, which pass into confluent blotches of bay distad, the normally covered portion of dextral tegmen solidly of this color; marginal field with a punctate pattern of clarity and disposition like that of the lateral sections of pronotum; costal margin of tegmina ochraceous. Wings pale dresden brown. Dorsum of abdomen clay color proximad,

passing to the dark color distad; venter almost solidly shining blackish fuscous; laterad the tergites and sternites have areas of pale base color sharply contrasted with adjacent dark sections, and punctulate with dark; supra-anal and subgenital plates with distal margins of pale base color dark punctulate; cerci pale, narrowly dark tipped. Coxæ marked proximad and distad with dark, surface with scattered dark punctulations laterad; lining on extensor margin of femora, distad on same, linings and punctulations on cephalic faces of same, blotching at spine insertions on tibiæ and narrowly distad on tibiæ, also narrowly distad on tarsal joints, dark.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♀, Playa Sardinera, Mona Island, type.....	18.5	5.2	6.4	14 mm.
♀, Playa Sardinera, Mona Island, paratype.....	19.7	6	6.9	13
♀, Playa Sardinera, Mona Island, paratype.....	20	6	7.6	15.5

In addition to the type we have before us two paratypic females, bearing the same data as the type, except that one was secured on February 24, 1914, at light at night. These specimens show no noteworthy difference from the type, except that in one the number of major proximal spines on the ventro-cephalic margin of the cephalic femora is three, instead of the more usual four. One specimen, the first paratype measured, has the pattern more intensive than in the type, the other paratype has it more recessive, and the lyrate and caudal dark markings of the pronotal disk in consequence are more open and less opaque.

***Epilampra abdomen-nigrum* (DeGeer)**

Plate XVII, Figures 2 and 3⁴

Blatta abdomen-nigrum DEGEER, 1773, 'Mém. Hist. Ins.,' III, p. 538, Pl. XLIV, fig. 5. ♀; Surinam.

Blatta livida DEGEER, 1773, idem, p. 538, Pl. XXXIII, fig. 6. ♂; Surinam.

E[pilampra] brevis BRUNNER, 1892, Proc. Zool. Soc. London, p. 203, Pl. xv, fig. 3. ♂, ♀; St. Vincent, West Indies; Cayenne.

Epilampra maya REHN, 1902, Trans. Amer. Entom. Soc., XXIX, p. 3. ♀ (recorded in error as a ♂); Machuca, Nicaragua.

Epilampra abortivipenna REHN, 1903, idem, p. 273. ♂ (recorded in error as a ♀); Bartica, British Guiana.

Epilampra maya brachyptera HEBARD, 1921, idem, XLVII, p. 210, Pl. XIII, figs. 9 and 10. ♂, ♀; Minatitlan, Vera Cruz, Mexico.

JAMAICA.—1922, 1 ♀, [U. S. N. M.].

PORTO RICO.—San Juan, 1 ♀, [U. S. N. M.]. Rio Piedras, Department of Humacao, VI, 5, 1922, (F. Sein), 2 ♀, [Dept. of Agr. Porto Rico]. Bayamon, Department of San Juan, I, 1899, (A. Busck), 1 ♀, [U. S. N. M.].

DOMINICA.—Long Ditton, VI, 20 to 22, 1911, (F. E. Lutz), 1 ♂, 1 ♀. No exact locality, VI to VII, 1913, (H. W. Foote; Yale-Dominican Exped.), 1 ♀, [U. S. N. M.].¹

ST. LUCIA.—Castries, IX, 10-22, 1919, (J. C. Bradley), 2 ♀, [Cornell Univ.].

GRENADA.—(Mrs. W. E. Broadway), 1 ♂, 3 ♀, [Hebard Cln.].

The occurrence of this species in Jamaica and Porto Rico is noteworthy but, to our minds, may be due to its introduction, probably from Trinidad, the Guianas or Amazonian Brazil. This probability is suggested by the character of the material, as explained below. The species may be endemic in Grenada, and also in St. Vincent, St. Lucia, Dominica and Guadeloupe, from three of which islands it previously has been recorded.² We feel, however, that it is more probably not a native of the West Indies, and particularly of the Greater Antilles. Against this attitude stands the fact of the rather peculiar appearance and greater size of the Dominican specimens and large size of the Jamaican specimen seen.

The re-examination of the types of DeGeer's *abdomen-nigrum* and *livida* by Shelford³ demonstrated the relationship of the two, *abdomen-nigrum* being based on the female and *livida* on the male sex, also their proper generic position and the specific identity of *abdomen-nigrum* and *brevis* of Brunner. The two DeGeerian names were overlooked by most authors up to and including the time of Kirby's 'Synonymic Catalogue,' and this was the major reason the names *brevis*, *maya*, and *abortivipenna* were proposed. Brunner in his 'Système' placed *abdomen-nigrum* with a query as a synonym of *Nyctibora holoericea*, which had the effect of diverting workers from considering it in connection with *Epilampra*. *Brevis* of Brunner was synonymized under *abdomen-nigrum* by Shelford and his action is supported by the material before us and the literature. The species *maya* was described from an individual dried from alcohol and considered a male, but it is now before us and is a female. On account of the more elongate alar organs it has quite a different general

¹Recorded by Caudell (1914, Proc. U. S. Nat. Mus., XLVII, p. 491) as *E. cribrata*.

²From St. Vincent and Grenada by Brunner as *brevis*: from Guadeloupe by Shelford in discussing the type of *abdomen-nigrum*: from Dominica by Caudell as *cribrata*.

³1908, Trans. Entom. Soc. London, (1907), p. 460-461.

facies from the *brevis* of Brunner, and for this reason, and the more limited knowledge of blattid variation possessed at that time, the two were not compared. *Abortivipenna* (a lapsus calami for *abortivipennis*), in a similar fashion, was based on a specimen supposed to be a female, but which is now before us and proves to be a male. Here again an error in recognition of sex brought up supposedly bisexual differential characters, which are, instead, features of sexual difference. In addition the size of the male type of *abortivipenna* is well under that of Central American males typical of *maya*. The synonym of *abortivipenna* under *abdomen-nigrum* was established by Rehn several years ago.¹ Hebard's subspecies *brachyptera* was based upon a form of the species from the state of Vera Cruz, Mexico, which has distinctly abbreviate tegmina and wings, but in the light of the material now assembled the recognition of this form does not appear advisable, at least until our knowledge of the value to be assigned to such differences is more clearly understood.

We now have before us the single female upon which Caudell recorded *Epilampra cribrosa* Burmeister from Dominica.² As shown above in our tabulation of material, we consider this to be a representative of the present species. The specimen has been completely dismembered, but it is quite large, in fact slightly larger than the female from Dominica measured below, and of the saturate type of coloration seen in the other Dominica individuals. We have examined the insect very critically, and are unable to find any valid reason for considering it other than the Dominican type of *abdomen-nigrum*.

At this writing we have before us material of the species from eleven localities, aside from the West Indian material here recorded, and it is evident that *abdomen-nigrum* is an exceedingly variable species, in general size, in relative alar development, and, to a lesser degree, in coloration. Material from Nicaragua, Costa Rica and Trinidad averages larger, in both sexes, than individuals from the state of Vera Cruz, Mexico (typical series of *E. maya brachyptera*), the Santa Marta region of Colombia, Demerara, Pará, Brazil, Grenada and Porto Rico. However, the material from Dominica is very large, in fact as large as any material seen and equalled only by Caparo, Trinidad individuals.³ The tegmina appreciably surpass the apex of the abdomen in both sexes from Nicaragua, Costa Rica, Panama and Trinidad, while the Mexican, Colombian, Demerara and Pará, as well as the Grenada, St. Lucia,

¹1916, Trans. Amer. Entom. Soc., XLII, p. 237.

²1914, Proc. U. S. Nat. Mus., XLVII, p. 491.

³The single Jamaican female does not seem sufficient to warrant any assumption as to the general large size of Jamaican material.

Dominica, and Porto Rico, individuals have the tegmina and wings seldom surpassing, often not reaching, the abdominal apex. The single male from the Santa Marta region of Colombia¹ is remarkable in having the tegmina falling short of the abdominal apex by a distance equal to the pronotal length, the wings thus so reduced as clearly to be non-functional. While there would appear to be a geographic correlation of greater size and elongate alar organs, with portions of Central America and Trinidad, and of smaller size and reduced tegmina and wings with southern Mexico, the Guianas, the Pará region of Brazil and several of the West Indies, this cannot be advanced as conclusively demonstrated by the material in hand. The large size of the Dominica specimens of both sexes is not in accord with such an assumption, which is strongly suggested by the remainder of the series. More information may show a definite environmental correlation of these conditions, and this would have some support from the remarkable extremely short-winged condition of the Santa Marta, Colombia, male mentioned above, while the Panamanian representatives are all macropterous. Environmental conditions where the material from the two regions was collected are known to us to be very different. The Guianan and Pará individuals, and this is equally true of the Grenada, St. Lucia, Dominica and Porto Rico specimens in hand, all have, regardless of size, relatively uniform ratios of tegminal and abdominal length, which gives them a more oval outline than the more brachypterous Mexican representation. For this reason we feel convinced the Porto Rico, Dominica, St. Lucia and Grenada colonies are of Guianan or similar origin, although the age of their establishment, whether by human agencies or otherwise, remains to be determined.

The interspace between the eyes varies in width somewhat in each sex, the greatest space being found in the Dominican specimens, which in each sex show slightly more width than the Guianan representatives. There is, however, considerable individual variation in the larger representations from single localities, and the true geographic or individual value of this feature can be determined solely by the examination of larger series from single localities. We know that this feature is an individually fixed and constant one in certain species and a very plastic and fluctuating one in others.

The color variation is, as usual, of two types, one tonal, the other in strength of pattern. The West Indian material is in tone darker than most of the Central American representation, more in agreement with

¹Hacienda Bolivar, near Santa Marta, Colombia, VII, 15, 1920, (R. and H.), [Hebard Cln].

that from the Guianas and Pará. The Dominican pair is extremely dark in general tone, combined with a very intensive pattern. At this writing, however, it seems best to refrain from further comments upon this phase of the species' variation, pending more extensive evidence of the stability of tonal values at single localities. The pattern variation is one of intensification and recession, the former bringing a weak lyrate pronotal disk pattern out of the general pronotal stippling, an appreciable dark line on proximal third of humeral trunk, and a more pronounced castaneous infuscation of the normally covered portion of the right tegmen. The number of principal tegminal dots or spots varies, the proximal portion of the discoidal field being with or without several, while those distad in the same field are invariably present, even in the bachypterous individuals. The tegminal spots of the second size category vary greatly in their number and distribution. There does not appear to be any correlation of pattern variation with geographic regions, except that the Dominican pair have the heaviest pattern of any material examined.

The West Indian material in hand, when compared with a Guianan pair, measures as follows.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Bartica, British Guiana (type of <i>abortipenna</i>).....	20.8	5.5	6.7	15.5	5.7 mm.
♂, Grenada.....	17.5	5.6	7	16	6.1
♂, Long Ditton, Dominica.....	23.2	7.2	7.9	18.5	7
♀, Demerara.....	26.2	6.8	8.3	18	6.9
♀, Grenada.....	1	6.7	8.8	18.2	7.3
♀, Grenada.....	22	6.7	8.8	19.5	7.2
♀, Grenada.....	23.8	7	8.5	18.4	7
♀, Castries, St. Lucia..	24	6.4	7.9	18.4	7.3
♀, Castries, St. Lucia..	23.9	6.2	8	18.5	7.6
♀, Long Ditton, Dominica.....	29	8.2	9.3	22.4	8
♀, San Juan, Porto Rico.....	25.3	7.2	8.7	18	6.9
♀, Bayamon, Porto Rico.....	23.5	6.9	8.5	18.2	7
♀, Rio Piedras, Porto Rico.....	24	6.4	8.5	18.3	6.4
♀, Jamaica.....	28	7.2	8.3	24	7.2

¹Lacking abdomen.

The range of the species have been covered in the discussion given above. We have seen no material from the area between the Santa Marta region of Colombia and Trinidad and the Guianas.

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***Epilampra gundlachi*, new species**

Plates XVII, Figures 4 and 5; XVIII, Figures 1 and 2

Epilampra burmeisteri SAUSSURE, 1864, 'Mém. Hist. Nat. Mexiq.,' III, p. 130, Pl. II, fig. 25. ♂, ♀; Cuba, by inference. (Only in part *Blatta burmeisteri* of Guérin, 1857.)

Epilampra burmeisteri SAUSSURE, 1870, 'Miss. Scientif. Mexiq.,' Rech. Zool., VI, p. 81. In part; Cuba only of localities given. (Not *Blatta burmeisteri* Guérin, 1857.)

E[pilampra] burmeisteri BOLIVAR, 1888, Mém. Soc. Zool. France, I, p. 128. In part; Cuba only, of localities given. (Not *Blatta burmeisteri* Guérin, 1857.)

Epilampra burmeisteri GUNDLACH, 1890, 'Contrib. Entom. Cubana,' IV, p. 309. Cuba. (Not *Blatta burmeisteri* Guérin, 1857.)

Epilampra burmeisteri SAUSSURE AND ZEHNTNER, 1893, 'Biol. Cent.-Amer., Orth.,' I, p. 66. ♂, ♀; Cuba. (Not *Blatta burmeisteri* Guérin, 1857.)

As will be seen from the above references this species has been long known, but the confusion surrounding it is equally old. This originated when Saussure in 1864 mistook it for *burmeisteri* of Guérin. As we are showing below under *burmeisteri* the present species is not that so named by Guérin, while Saussure's 1864 description and figure are unquestionably of the present species. This error of identification has persisted down to the present time; Saussure's first identification of it as a variety of *azteca* or Saussure and Zehntner's later name *caraibea* has been used by all authors for the true *burmeisteri*. A very critical examination of the literature involved has enabled us to state our conclusions with full certainty and conviction in the matter.

When compared with *E. burmeisteri* the present species is seen to differ in the male sex, the only one possessed of *gundlachi*, in its larger size, in the more transverse pronotum, which also has the cephalic margin more regularly arcuate, in the greatly reduced pattern of the pronotum, which has the regularly and closely punctulate pattern of *burmeisteri* replaced by a microscopic atomaceous sprinkling, in the tegmina being proportionately broader distad, in the base color of the marginal field of the tegmina, not being sharply contrasted with that of the remainder of the tegmina in the lining of the tegminal humeral trunk decided but short, in the tegminal pattern sparse but marked, not approaching the regular sprinkling of *burmeisteri*, in the irregularly disposed costal veins of the wings, in the more deeply incised male supra-anal plate, and in the presence of a large and striking blackish median spot on the male subgenital plate.

We take pleasure in dedicating this long unnamed species to Juan Gundlach, the great Cuban zoölogist.

TYPE.—Male; Baracoa, Oriente Province, Cuba. November, 1915. [Hebard Collection, Type No. 819.]

Size medium; form moderately elongate (for genus).

Head narrowly evident cephalad of pronotum when seen from dorsum, in cephalic aspect cordiform, as broad as deep; interocular space moderately broad for this sex, faintly broader than that between ocelli, slightly less than one and one-half times as broad as occipital depth of eye.

Pronotum about one and one-half times as broad as greatest length of same, greatest width slightly caudad of middle of pronotum; lateral portions moderately deflexed, broadly and regularly passing into disk: cephalic margin narrowly weak arcuate, regularly passing into the diverging and greatly arcuate lateral margins, caudo-lateral angles narrowly rounded obtuse-angulate; caudal margin moderately and rather broadly produced mesad.

Tegmina surpassing apex of abdomen by slightly less than one-half of pronotal length, broad, their greatest width contained very slightly less than three times in greatest length of same: apex rather narrowly rounded, more costal than sutural in position: marginal field of moderate width; anal field elongate pyriform, anal sulcus joining sutural margin but slightly proximad of middle; all wing nervures distinct and pronounced. Wings with costal veins quite irregular in disposition; ulnar rami twenty in number, regular in disposition and arcuation toward apex of wing.

Abdomen of medium build, caudo-lateral angles of tergites not produced, as usual in male sex of genus. Supra-anal plate transverse, greatest proximal width nearly twice greatest length of plate; margin strongly arcuate from lateral bases to median divided rectangulate emargination. Cerci somewhat longer than supra-anal plate, fusiform. Subgenital plate moderately transverse, distal margin arcuate, somewhat unsymmetrical, having dextrad a considerable but shallow concavity which is unrepresented sinistrad.

Limbs moderately robust. Cephalic femora with ventro-cephalic margin with three to four larger proximal and two large distal spines, the intervening section of margin with short spinulæ; ventro-caudal margin with four to five larger spaced spines, one of which is distal. Ventral margins of median and cephalic femora with well-developed spines.

General base color light ochraceous-buff, becoming pale ochraceous-buff on tegmina. Dark pattern as a whole between mars brown and prout's brown, as detailed below, except in parts specifically stated to be blackish fuscous. Head with occiput lightly marked proximad with dark, distad pale with sparse punctulations, interocular region with two large, subcontiguous areas of blackish fuscous, which are truncate dorsad and their internal margins arcuately diverging, abruptly limited ventro-laterad by the ocelli; a weak, transverse, mesad interrupted narrow line of dark, which in the middle of each lateral half has a sigmoid flexure; mesad on the lower face is a subcircular spot of dark; eyes chestnut-brown; antennæ ochraceous-tawny, moderately infusate proximad. Pronotum with a minutely atomaceous punctulation, which is rather heavily and regularly distributed; a series of larger but still not at all conspicuous punctulations are scattered sparingly on the pronotum, more distinctly in a peripheral arrangement; meso-caudad is placed a few distant punctæ, which are

arranged in pairs and probably represent the remnant of the lyrate pattern; lateral margins weakly lined with dark. Tegmina with humeral trunk strongly but irregularly marked with blackish fuscous for somewhat less than one-fourth of tegminal length; punctæ relatively few, well spaced, sharply defined, never confluent or nebulous, those of discoidal field relatively large, a few punctulations irregularly distributed in anal and discoidal fields; scapular field and apex with a regular marginal ticking of dark. Wings ample; costal veins irregular; ulnar vein with twenty rami, moderately arcuate. Abdomen with median portion of tergites moderately infumate and with scattered dark punctulations, also disto-lateral dark blotches, which leave a narrow pale lateral marginal edging; supra-anal plate with a transversely disposed, proximal shining blackish fuscous area; venter of abdomen with pattern of scattered dark punctations; subgenital plate with a large, subcircular spot of shining blackish fuscous which occupies almost the whole length of the plate. Coxæ in large part punctulate with dark, femora with numerous similar punctulæ; femora lined on extensor margin, on sculpture of cephalic face, a proximal and a pre-apical blotch, which are well marked only on cephalic pair, and at spine bases, with dark; tibiæ with spine bases marked with fuscous; tarsi with joints narrowly darkened distad; spines auburn.

Length of body, 23.3 mm.; length of pronotum, 4.7; greatest width of pronotum, 6.5; length of tegmen, 17.9; greatest width of tegmen, 6.5.

The type is the only specimen of this insect now before us.

Few exact localities have been given in the literature for the species. Gundlach says it is found over all the island of Cuba, while Rehn, in 1909, reported it from Cayamas, Oriente Province (as *burmeisteri*). Shelford¹ reports it, as *burmeisteri*, from Jamaica, Guiana and Brazil, although we feel certain the last two represent another species. The Jamaican record, however, is probably correct and may be that of an adventive from Cuba. At any rate this is the only species of the genus except *E. abdomen-nigrum* which has been recorded from Jamaica.

***Epilampra burmeisteri* (Guérin)**

Plates XVII, Figures 6 and 7; XVIII, Figures 3 and 4

Blatta (*Phyllodromia*) *burmeisteri* GUÉRIN, 1857, in La Sagra, 'Hist. Phys. Polit. et Nat. Île Cuba, Anim. Artic.,' p. 345. Cuba.

Epilampra burmeisteri SAUSSURE, 1864, Mém. Hist. Nat. Mexiq., III, p. 130. Cuba, by inference. (Only in part *Blatta burmeisteri* of Guérin, 1857.)

Epilampra azteca var., SAUSSURE, 1870, Miss. Scientif. Mexiq., Rech. Zool., VI, p. 83. Cuba. (Not *E. azteca* Saussure, 1868.)

E[pilampra] azteca BOLIVAR, 1888, Mém. Soc. Zool. France, I, p. 128. ♀; Cuba. (Not of Saussure, 1868.)

Epilampra azteca GUNDLACH, 1890, 'Contrib. Entom. Cubana,' IV, p. 310. Fermina, Cuba. (Not of Saussure, 1868.)

Epilampra caraibea SAUSSURE AND ZEHNTNER, 1893, 'Biol. Cent.-Amer., Orth.,' I, p. 65. ♀; Cuba.

¹1906, Trans. Entom. Soc. London, p. 276.

CUBA.—[No exact locality], (Gundlach), 1 ♂, 2 ♀, [Hebard Cln. and M. C. Z.]. Marianao, Havana Province, I, 23, 1914, (Hebard), 1 immature ♀, [Hebard Cln.]. Cotorro, Havana Province, VII, 1920, (José Cabrera), 2 ♂, 2 ♀, 1 immature ♀, [A. N. S. P.]. Baracoa, Oriente Province, II, 25, 1915, 1 ♂, [Davis Cln.].

As we have stated above under *E. gundlachi*, the present specific name has been erroneously used since 1864 for that insect. Such disposition of the name *burmeisteri* made the use of first *azteca* variety, and later the new name *caraíbea* necessary for the present insect. It is unfortunate that the name *caraíbea* requires synonymizing and that the erection of a new specific one is necessitated, but the evidence in the case leaves no other alternative.

Guérin's description was based on "un seul individu mutilé auquel il manque l'extrémité de l'abdomen." The length was given as 21 millimeters, from which it would seem the type is or was a female. The pronotum is said to be "entièrement couvert de petits points bruns très-inégaux et moins rapprochés vers les bords ce qui rend ceux-ci un peu pâles." The tegmina are said to be "largement bordées de jaune pâle à leur marge externe," and also "elles sont couvertes de nervures saillantes de la couleur du fond et de petites taches brunes très-inégales, et offrent chacune une ligne noirâtre partant de l'angle huméral, séparant le jaune des bords de leur disque plus brun et s'effaçant insensiblement au delà de leur milieu." These features are convincing evidence of the identity of the present species as compared with *gundlachi*, the only other species which could be confused.

In 1870 Saussure, in the Mission Scientifique, states that "sous le nom de *burmeisteri* M. Guérin a confondu deux espèces, et nous avons continué cette erreur dans notre précédent travail." The latter remark refers to the 1864 citation in the Mémoires, which confounds the two species. Saussure is correct as far as his previous work is concerned, but, as shown above by the quotation from Guérin, wrong as far as the original author's type material is concerned. The original material having been unique the species could not have been based on two species, no matter what determinations were placed on material subsequently examined.

An examination of the 1870 descriptions, and those of *caraíbea* and *burmeisteri* given in the Biologia (1893), will show that the species having the contrasted pale marginal field of the tegmina, sharply separated by the dark humeral trunk, and the heavily punctulate disk and anal fields of the same, is that called first *azteca* (by error), then *caraíbea*.

As shown above this form answers Guérin's description, while Saussure's 1864 figure well represents the species we are calling *gundlachi*.

From the data now available this species is apparently restricted to the island of Cuba, over which it is widely distributed. Detailed records are available from Guanajay, Pinar del Rio Province (Rehn, in 1909, as *caraibea*), Havana (the same recorder), Marianao, Havana Province, Fermina (Gundlach, in 1890, as *azteca*) and Baracoa, Oriente Province.

***Epilampra wheeleri* Rehn**

Plate XVII, Figures 8 to 10

Epilampra wheeleri REHN, 1910, Bull. Amer. Mus. Nat. Hist., XXVII, p. 73. ♂; Mandios, near Utuado, Porto Rico.

PORTO RICO.—Adjuntas, Department of Aguadilla, VI, 8-13, 1915, (Lutz and Mutchler; in siftings from primæval high altitude forest), 1 ♂, [A. M. N. H.]. No exact locality, (E. A. Wagener), 1 ♀, [U. S. N. M.].

This interesting species is, as far as present knowledge goes, restricted to the higher country of Porto Rico, probably in the remnant areas of the original forest cover of the island. The two localities from which the species is known are in the western part of the central elevated section known as the "Cordillera Central." In the lower country about San Juan the genus is known to be represented by *E. abdomen-nigrum*, which may be an accidental introduction. *Wheeleri* is a well-defined member of the *Burmeisteri* Group of the genus and needs comparison solely with that species, *sabulosa* Walker and *haitensis* of the present authors. From *burmeisteri* the present insect differs in its appreciably greater size and more robust build, in the eyes being more widely separated in the male sex, in the pronotal punctulations being heavier and more dense, in the distinction in coloration between marginal and scapular fields and discoidal and anal fields of tegmina less sharply indicated, the dark lining of the humeral trunk less extensive in consequence, the marginal and scapular fields rather heavily punctulate with reddish, and the piceous spot on the disk of the subgenital plate indicated in both sexes. From *haitensis*, of Hispaniola, *wheeleri* can be separated by its distinctly larger size, by the less pronounced chestnut-brown color of the normally covered section of the right tegmen, by the more uniform character of its tegminal punctulations and their rufous color, the less distinct piceous disk of the male subgenital plate, by its more punctulate coxæ and femora and more densely cribroso-punctulate abdominal venter. From *sabulosa* Walker, also from Hispaniola, the Porto Rican insect is

separated by its more robust build, proportionately broader pronotum, greater ocular interspace, paler occiput, more longitudinal lateral section of pronotum, when seen in profile, the caudo-lateral angles of same rounded sub-rectangulate instead of obtuse, in the shorter and broader tegmina, the costal margin of which is more regularly arcuate, and in the piceous character of the disk of the female subgenital plate, the same region in the male sex having its piceous infuscation covering all of the subgenital plate except narrowly along distal and lateral margins, instead of merely a disto-mesal blotch.

As the female sex was previously undescribed we are adding a few features of difference from the male, drawn from the female listed above.

Size medium; form relatively robust, elongate ovate in outline. Head with interocular space equal to one and one-third times greatest occipital depth of eye. Pronotum large, greatest length contained one and one-fourth times in greatest width of same. Tegmina surpassing apex of abdomen by about one-half of length of pronotal disk; costal margin well arcuate, particularly proximad; apex of anal field reaching to approximately middle of tegmen. Wings with costal veins regularly disposed; ulnar rami twenty-two in number, oblique, those proximo-distad more arcuate than those mesad. Abdomen with caudo-lateral angles of tergites rectangulate to very faintly produced. Supra-anal plate damaged; subgenital plate with its margin equally damaged.

The coloration of the female calls for but one comment. The subgenital plate has the medio-proximal portion and the center of the distal section dark, that proximad more maroon, that distad more fuscous, the latter with moderately sharp, pale lateral bounding lines.

The above listed female measures as follows: length of body, 22 mm.; length of pronotum, 6.8; greatest width of pronotum, 8.4; length of tegmen, 20.5.

Sein¹ has reported and figured what he considers this species from Porto Rico, stating it is encountered in abundance in fields of fodder. There appears to be little doubt in our minds but that *E. abdomen-nigrum* is the species he had before him, judging from the figure and his comments.

***Epilampra haitensis*, new species**

Plate XXV, Figures 1 to 3

This interesting species, which has quite distinctive color features, is a member of the *Burmeisteri* Group. Its nearest relative is *E. wheeleri* Rehn, of Porto Rico, but it possesses readily recognized diagnostic color

¹1923, Circ. No. 64, Dept. Agric. y Trabajo, Porto Rico, p. 11.

characters in the marked black edging of the lateral sections of the pronotum and of the proximal section of the costal margin, also in the lateral sections of the pronotum and the marginal field of the tegmina being distinctly, though not sharply, contrasted with the base tone of the pronotal disk and discoidal field of the tegmina. From *burmeisteri* it at once can be separated by the distinct lyrate pattern of the pronotal disk, the abbreviate dark lining of the humeral trunk of the tegmina and restriction of the pale ground color to the costal field, instead of its presence on both the costal and scapular fields of the tegmina, as well as the sparser character of the punctulations of the discoidal and anal fields of the same, by the dark disk of the male subgenital plate, and the coloration of the dorsum of the abdomen. The deep chestnut-brown of the normally covered portion of the right tegmen and the decided dark lateral margins of the dorsum of the abdomen are also features diagnostic among related West Indian forms of the genus.

TYPE.—Male; Port-au-Prince, Haiti, Hispaniola. 1909. (G. Lion.) [Hebard Collection, Type No. 985.]

Size relatively small (for the genus); form ovate-elliptical; surface dully polished.

Head broad cordiform, greatest width across eyes subequal to greatest depth of head, occiput regularly arcuate when seen in facial aspect, eyes not at all prominent; occipital interspace between eyes broad, faintly greater than occipital depth of eye, least width between eyes but little dorsad of ocelli; interspace between ocelli slightly less than least width between eyes. Palpi relatively short, robust; antepenultimate joint short, but slightly longer than penultimate joint, deep; penultimate joint short, markedly infundibuliform; ultimate joint one and one-half times as long as penultimate joint, acute sublanceolate in lateral outline.

Pronotum with greatest length contained one and one-fifth times in greatest width of same, of the type and form usual in *Epilampra*, greatest width slightly caudad of middle; caudal margin markedly obtuse-angulate produced.

Tegmina relatively coriaceous, with apices surpassing apex of abdomen by approximately half the pronotal length, broad lanceolate, greatest width contained slightly less than three times in length of same; costal margin appreciably arcuate in proximal half, much straighter distad, rather briefly rounding to apex of tegmen; marginal field short and relatively broad, not reaching as far distad as apex of anal field; venation relatively heavy, numerous, differentiation between rami, axillary veins and intercalated veins little evident. Wings reaching to the tegminal apices when in repose.

Supra-anal plate with its general outline semicircular, narrowly divided meso-distad. Cerci moderately elongate, distinctly longer than median length of subgenital plate, tapering, subdepressed, distal joint elongate moniliform, blunt at apex. Subgenital plate not markedly asymmetrical, weakly oblique truncate dextrad from proximad of dextral styler base to rounded apex, sinistral side of margin moderately arcuate, slightly oblique subtruncate distad of sinistral styler base; styles simple, slender, subequal.

Cephalic femora having ventro-cephalic margin with three to four large, more proximal spines, a pair of unequal distal spines and an intermediate series of spinules; ventro-caudal margin of same femora with four large spaced spines. Caudal tarsi with proximal joint subequal in length to remaining joints combined.

ALLOTYPE.—Female; Pétionville, Haiti, Hispaniola. Elevation about 2250 feet. January 24 to 29, 1922. (F. E. Watson; under stones.) [American Museum of Natural History.]

The following features are those of difference from the description of the male sex. Size somewhat larger.

Head with interspace between eyes broader, equal to one and two-thirds times occipital depth of eye.

Supra-anal plate essentially as in male. Subgenital plate large, transverse, broadly arcuate distad, infra-cercal emarginations shallow. Cerci distinctly shorter, about two-thirds as long as median length of subgenital plate, less attenuate distad, much more slender than in male; distal joint not elongate, hardly moniliform.

General pale base color light ochraceous-buff, becoming cinnamon-buff to clay color on disk of pronotum and anal and discoidal fields of tegmina, as seen from above the pale color is most evident and clearest on the lateral portions of the pronotum and marginal fields of the tegmina; venter very largely of the pale base color; dark overlying pattern largely blackish fuscous, passing to russet and prout's brown maculations distad on the tegmina. Head with four longitudinal occipital markings, the median pair more extensive cephalad and meeting the nearly (♀) or quite (♂) solidly dark interocular spot, which has a ventral tongue on each side reaching (♂) or internally embracing (♀) each ocellus. In the female the interocellar region is largely dark, producing a transversely fasciate appearance. Eyes prout's brown to fuscous. Antennæ washed with cinnamon-brown to prout's brown. Pronotum with dark overlay of disk relatively heavy, particularly in the female sex, made up of a dense marmorato-punctulate pattern, elements of which fuse to form a series of blotches and lines making an evident lyrate pattern; over the narrow, well-contrasted, paler lateral sections of the pronotum the punctulations become cinnamon-brown to russet; heavy lateral marginal pencilling of the pronotum, not indicated on cephalic or caudal margins, blackish fuscous. Tegmina with dark punctulations of scapular and discoidal fields rather evenly distributed, of the tones mentioned above, with scattered groups of larger dots, particularly in distal section of discoidal field; marginal field pale, but very sparsely punctulate with darker, costal margin of this field alone strongly lined with blackish fuscous similar to lateral margins of pronotum; a brief but distinct dark humeral line is indicated, while the normally covered portion of the right tegmen is strikingly and contrastingly chestnut-brown, or almost wine-colored. The dorsum of the abdomen has a transversely banded appearance, due to the presence of dark bars proximad on each segment, these broadened near the lateral margins, producing evident dark lateral borders; the supra-anal plate is largely dark with base and apical section of margin pale. The coxæ are almost unspotted, the femora lined with dark on extensor and cephalic surfaces, as well as distad. The tibiæ of the female are incompletely dark lineate, particularly dorsad, in the male the lineations are faint. Venter of abdomen punctulate with dark, more densely so laterad, the punctulations much fewer in the male than in the female, the size of the same varying appreciably, stigmatic spots decided. Subgenital plate of male with a median clouded blotch; of female with a pair of marked median dark dots, occasionally another more proximal pair. Cerci narrowly dark tipped.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Port-au-Prince, Haiti, type.....	18.5	5.1	6.2	16.8	6 mm.
♂, Pétionville, Haiti, allotype.....	19.2	5.1	6.6	18.5	6.2
♀, Pétionville, Haiti, paratype.....	20	5.2	7	20.4	

We have before us in addition to the type and allotype a damaged female paratype bearing the same data as the allotype, and a female paratype, measured above, from the same locality, but taken by W. M. Mann and from the collection of the Museum of Comparative Zoölogy. The damaged female lacks its head, apices of the tegmina and is otherwise injured, so its measurements have not been given. The female collected by Mann has more elongate alar organs, but no other noteworthy features of difference are apparent.

***Epilampra sabulosa* Walker**

Plate XXV, Figures 4 to 6

Epilampra sabulosa WALKER, 1868, 'Catal. Blatt. Brit. Mus.,' p. 70. ♀, "St. Domingo."

Epilampra microspila WALKER, 1868, idem, p. 208. ♂, "St. Domingo."

HISPANIOLA.—Port-au-Prince, Haiti, 1909, (G. Lion), 1 ♀, [Hebard Cln.]. Bourdon, Haiti, V, 19, 1922, (O. W. Barrett), 2 ♂, [Hebard Cln.]. La Morinière, Haiti, elevation about 125 feet, III, 1-5, 1922, (F. E. Watson), 2 ♂.

Through the kindness of Mr. B. Uvarov, of the British Museum of Natural History, the types of Walker's *sabulosa* and *microspila* have been re-examined and compared with notes furnished by the authors. The notes and measurements supplied by Uvarov leave no doubt in our minds as to the identity of Walker's species, which were clearly based on opposite sexes of the same species. Detailed comparisons of our material have been made with the notes drawn from the types, and with the detailed measurements given by Uvarov, the result of which is that the apparent differences are found to be sexual. The measurements given below show the agreement in size of our material with the typical specimens, as measured by Uvarov.

The major features of difference of this species from *burmeisteri* are the greater size, the more uniform coloration, with contrast of the tegminal fields far less marked, the distinct lyrate pattern of the pronotal disk, the facial pattern and the less distinct eyes, while the subgenital plate of the male has its disto-mesal section solidly blotched with pitch brown. From *wheeleri* the differential features have already been cited under that species. From *haitensis*, the present species can be distinguished by a more elongate form and more slender build, different facial pattern, which is largely punctulate without a solid purely interocular bar, size difference, absence of dark lateral marginings of the pronotum, the more elongate and less opaque tegmina, the darkened pencilling of the humeral trunk of the tegmina, lack of marked coloring of the normally covered portion of the dextral tegmen, more extensive and solid dark blotch on disk of male subgenital plate, and heavily punctulate limbs.

The species is a member of the *Burmeisteri* Group, and in general appearance much suggests *wheeleri*, to which it is more nearly related than to any other known to us. Its chief characteristics are as follows.

Form of medium build. Head with interspace between eyes equal to two-thirds of (♂) or barely greater than (♀) greatest occipital depth of eye; facial pattern consisting of numerous good-sized dark punctulations, which sometimes (♂ weakly, ♀ distinctly) coalesce into an inter-antennal-ocular subquadrate patch, which is sufficiently broken dorsad to show its origin; occiput largely dark. Pronotum of same general shape as in *wheeleri* but smaller and less robust, lateral margins as remarked under *wheeleri*; pronotal dark pattern—a central lyrate figure, an encircling group of fair-sized punctæ, and over all an atomaceous punctulation, no dark lateral marginal linings. Tegmina surpassing apex of abdomen by about pronotal length, relatively elongate, moderately hyaline; pattern much like in *wheeleri*, but darker and without rufous tendency, the individual points sharper, smaller and dot-like, the lining of the humeral trunk more extensive and largely solid. Limbs heavily dark punctulate, the femora also lined on cephalic and extensor surfaces; tibiæ with dorsal and ventral surfaces appreciably lineate mesad with dark. Subgenital plate of male with medio-distal section solidly pitch brown, leaving pale buff margins entire; subgenital plate of female with no solid blotch, merely proximal concentration of atomaceous punctulæ.

Apparently this species has a distribution extending over both of the republics of Hispaniola, although Walker's "St. Domingo" may refer to the island as a whole and not to the Dominican Republic alone.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, "St. Domingo," Walker's type of <i>microspila ex</i> Uvarov	20.5	5	6	20	6 mm.
♂, Bourdon, Haiti....	20	5.1	6	18	5
♂, Bourdon, Haiti....	20.7	5.6	6.5	20	5.8
♂, La Moriniere, Haiti.	18	5	6.4	18.8	5.6
♂, La Moriniere, Haiti.	18.6	5.3	6.2	18.8	5.8
♀, "St. Domingo," Walker's type of <i>sabu-</i> <i>losa, ex</i> Uvarov.....	24	6	7.5	24.5	7
♀, Port-au-Prince, Haiti	23.8	6.5	8	23	7.4

***Epilampra quisqueiana*,¹ new species**

Plates XVII, Figures 11; XVIII, Figure 6

This species belongs to a group, which we are tentatively referring to as the *Grisea* Group, comprising at least two other species known to us, i.e., *grisea* (DeGeer) and *substrigata* Walker. The first is a Guianan and eastern Brazilian form, the latter, as far as present knowledge is concerned, is a native of eastern Colombia. The three species agree in general facies; a relatively weak pattern with little contrast, lack of solid marking of humeral trunk and a peculiar darkening of the surroundings of the apices of the distal costal veins of the wings.

From *grisea* the present species differs chiefly in its somewhat smaller size, appreciably broader interocular space, different pattern of same and of face, more rounded occipital margin of eyes, the more numerous rami of the discoidal vein of the wings, the less truly triangular and more rounded in general outline male supra-anal plate, which also has the median emargination less pronounced, in the male subgenital plate being less trigonal and arcuate distad, and in the latter not having a pronounced dark discal spot. From *substrigata*, *quisqueiana* differs in its smaller size and rather less robust build, narrow interocular space, which has, however, a similar pattern, in the more rounded occipital margins of the eyes, in the lack of chestnut-brown on the normally covered portion of dextral tegmen, more produced anterior field of the wings, in the median emargination of the male supra-anal plate being far

¹From "Quisqueya" an aboriginal name for Hispaniola.

shallower and less evident, and in the male subgenital plate showing the same differences as from *grisea*.

TYPE.—Male; San Lorenzo,¹ Province of Samaná, Dominican Republic, Hispaniola. June 24–26, 1915. (F. E. Watson.) [American Museum of Natural History.]

Size relatively small; form as usual in the genus.

Head narrowly visible cephalad of pronotum for approximately entire head width; interocular space moderately wide, faintly less than occipital depth of eye, subequal to interocellar space; eyes large, dorso-internal margins against interocular space arcuate.

Pronotum of type usual in genus, lateral sections well deflexed, broadly rounding into disk; cephalic margin well arcuate and regularly passing by a rounded obtuse-angulation into the arcuato-truncate lateral margins; caudo-lateral angles more angulate than cephalo-lateral angles, yet rounded obtuse.

Tegmina surpassing apex of abdomen by approximately length of pronotum, in general of subequal width; costal and sutural margins in large part parallel, costal margin weakly arcuate proximad and briefly but sharply so to the relatively rounded apex, which is more costal than sutural in position: marginal field relatively broad; anal field elongate pyriform, anal sulcus reaching sutural margin at two-fifths of length of same. Wings with regularly placed costal veins; ulnar rami seventeen in number, moderately arcuate; anterior field of wing with its apex appreciably surpassing axillary region.

Abdomen with caudo-lateral angles of tergites obtuse-angulate, not produced. Supra-anal plate transversely rounded trigonal, lateral margins distinctly arcuate, median emargination very shallow and broad. Cerci moderately elongate, sub-depressed, attenuate distad, their length about one and one-half times that of supra-anal plate. Subgenital plate but weakly asymmetrical; styles similar, slight, weakly decurved, dextral one less distal in its position than sinistral style.

Cephalic femora with ventro-cephalic margin bearing three large proximal and two large distal spines, spinulose between; ventro-caudal margin with four large spaced spines. Median and caudal femora with margins well armed. Caudal tarsi four-fifths as long as caudal tibiae; caudal metatarsi comprising one-half of tarsal length; pulvilli distinct but not large; arolia evident; tarsal claws equal, margins simple.

ALL TYPE.—Female; Sanchez, Dominican Republic, Hispaniola. May 11–16, 1915. (F. E. Watson.) [American Museum of Natural History.]

The following features are those of difference from the male sex.

Size medium. Interspace between eyes slightly greater than in male, subequal to occipital depth of eye; eyes slightly smaller.

Tegmina surpassing apex of abdomen by about one-half of pronotal length, proportionately broader than in male.

Abdomen with caudo-lateral angles of tergites as in male. Supra-anal plate with general form as in male, but median emargination deeper, fissate with the sides of the fissure in contact and seen from below apparently forming a tectate ridge. Subgenital plate very large, broad, margin shallowly and weakly concave ventrad of the

¹See p. 26, footnote 2

cerci, well arcuate mesad. Cerci much shorter than in male, little surpassing supra-anal plate. Cephalic femora with ventro-cephalic margin having four spines proximad, remainder of margin armed as in male; ventro-caudal margin with five spines. Caudal tarsi about two-thirds as long as caudal tibiae; caudal metatarsi comprising slightly more than one-half of entire tarsal length.

General pale color light ochraceous-buff to warm buff, with a closely stippled but not sharply contrasted pattern of darker, which varies from russet to mummy brown in tone. The pattern is distributed as detailed below. Occiput and dorsal interocular section dark punctulate, arranged roughly in longitudinal series; ventral inter-ocular region and interocellar space marked broadly with mummy brown, this with a solid subquadrate to trapezoidal blotch, dorsad briefly and narrowly divided for one-half its median depth, ventrad of this blotch in the males the face is dark punctulate, grouped chiefly across lower part of face and a weak ventro-ocular lining;

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Width of Tegmen
♂, San Lorenzo, Dominican Republic, type.....	17.8	5.2	6.5	18	5.4mm.
♂, San Francisco Mts., Dominican Republic, paratype.....	16.7	5	6	16.5	5.2
♀, San Francisco Mts., Dominican Republic, paratype.....	20	5.5	6.5	19.3	6.1
♀, Sanchez, Dominican Republic, allotype...	22.5	6.2	7.1	21	6.5

in the female sex interocellarly there is a dark transverse ellipse, enclosing a pale area, and connected with ventro-ocular dark lines, thus forming a more or less evident transverse dark bar, the pale areas of the face also punctulate. Eyes chestnut-brown to fuscous. Antennae of general color, moderately infumate distad of proximal joint. Pronotum entirely with a fine atomaceous punctulation of russet, slightly more open and less dense on lateral portions, an encircling series of larger punctulations of mummy brown near the pronotal margins, no lyrate pattern indicated mesad. Tegmina with a closely placed, but hardly atomaceous punctulation of dark, a certain number in the anal and discoidal fields true punctae in size, contrasting with the more minute feature of the pattern, the latter sometimes weakly nebulous distad on the tegmina and exhibiting a tendency to become confluent transversely; humeral trunk with usual punctulation of pattern but no distinct or contrasted lineation. Wings with dark marginal tips to certain of the distal costal veins, the discoidal rami and the median vein. Dorsum of abdomen faintly punctulate with russet laterad; venter of abdomen with a masking atomaceous punctulation and a far sparser series of larger

punctulations; in the male both elements far more sparsely indicated than in the female, and the atomaceous one virtually absent proximad. Subgenital plate of male with a weak dextral intermarginal darkening. Limbs with scattered dark punctulations, weak extensor dark lining of femora; points of insertion of larger spines of femora and tibiae marked with dark.

In addition to the type and allotype we have before us four males from San Lorenzo, the locality of the type, bearing the same data as the latter, except for date, and from The American Museum of Natural History; and two males and two females from the San Francisco Mountains, thirteen kilometers north of San Cristobal,¹ Province of Santo Domingo, Dominican Republic, taken September, 1905, by August Busck, and from the United States National Museum. The San Lorenzo specimens were taken June 24 to 28, 1915. There is little in the way of variation in the series calling for comment, except that the number of proximal large spines on the ventro-cephalic margin of the cephalic femora varies from three to five. The size exhibits appreciable variation in both sexes, as shown by the above table of measurements. The disposition of the larger punctulations of the tegmina shows considerable but relatively unimportant variation, but in no case is the usual lyrate pronotal pattern even weakly indicated by dark markings.

HOMALOPTERYX Brunner

An aggregation of more than a dozen species from the Oriental, Papuan, Australian and Neotropical regions have been placed in this genus by various authors, but it is evident from even the most superficial study of the single West Indian species and one of the Indian species that more than one generic entity is involved. The genus was based on *H. capucina* Brunner, described from Venezuela and Colombia, a species we have not seen, but which was originally well figured. To this the West Indian species is closely related and with it clearly congeneric. There exists, in consequence, some doubt in our minds as to whether true *Homalopteryx* occurs outside of tropical America. Certainly the species with which we are at present engaged is a true *Homalopteryx*, and we would seem justified in suggesting that the Old World forms may eventually prove to be generically distinct.

The epilamprine genus *Rhcnoda* Brunner² has been an uncertain factor in the systematics of the subfamily, and it appears very probable that at least a few of the species which have been referred to it belong to

¹See p. 11, footnote 1.

²1893, Ann. Mus. Civ. Stor. Nat. Genova, XXXIII, p. 30, Pl. I, figs. 11a, 11b.

other, previously established, genera. The genotype of *Rhcnoda* is *R. rugosa*, an Oriental species, of which female material is before us, and the results of an analysis of the features of *Homalopteryx*, on the basis of *H. laminata*, and *Rhcnoda*, as evidenced by *rugosa*, seem worthy of comment. The main occasion for this note is that *laminata* has been considered a *Rhcnoda* by Saussure and Zehntner,¹ who were followed in this by Kirby.

Rhcnoda

♀. Interspace between eyes subequal to that between ocellar spots.

♀. Vestigial arolia present.

♀. With lateral triangular tegmina.

Homalopteryx

♀. Interspace between eyes distinctly greater than that between ocellar spots.

♂. Interspace between eyes subequal to that between ocellar spots.

♂, ♀. Arolia well developed, prominent.

♀. Without lateral triangular tegmina, completely apterous.

Little is definitely known of the male sex of *Rhcnoda rugosa*, as the specimen so assigned by Brunner was referred with a query. In addition the description is so brief that we are unable to gain desired light on quite a few points. No specimen of the male sex referable to *rugosa* is available for study at this time.

It is evident that *Rhcnoda* and *Homalopteryx* are not widely separated genera, also that their differentiations cannot be fully summarized until the male sex of *rugosa* is definitely known and critically examined. Tentatively, at least, it is clearly best to endeavor to arrange our material in these two genera, as they would appear to be distinguished by the features given above. Whether these differences will stand the test of additional information, and critical examination of all the known species which have been referred to *Rhcnoda*, remains to be determined.

***Homalopteryx laminata* Brunner**

H[omalopteryx] laminata BRUNNER, 1892, Proc. Zoöl. Soc. London, p. 204, Pl. xv. fig. 4. ♀; Lot 14 Estate, Château-belais and in forest at 2000 feet, St. Vincent, British West Indies.

The specimens which formed the basis of Brunner's description comprised adult females and immature males, taken at the three localities on St. Vincent given in the above quoted reference. In the forest the collector, H. H. Smith, found the insect in decaying leaves. No West Indian material is in hand, nor has any been recorded by an author

¹1893, 'Biol. Cent.-Amer., Orth.,' I, p. 69.

other than Brunner, but we are well acquainted with the species, as it occurs in Trinidad and Venezuela, from which regions we have material before us. The sexes differ greatly, the male being fully winged and of a very delicate texture, while the female is apterous, subpatelliform and relatively scabrous.

Calolamprea Saussure

This genus which bears a relationship to *Epilamprea* somewhat similar to that of *Audreia*, but apparently in an antithetical manner, is as far as known at this writing entirely an Old World Group, except for the new species here discussed. Certain New World forms have been referred to the genus in the past, but these associations are now known to have been erroneous.¹ The species of *Calolamprea* show marked sexual differences, the males having fully developed tegmina and wings and a general form which suggests both *Epilamprea* and the Old World arid land genus *Polyphaga*, while the females are broad and heavy and may either lack tegmina and wings, or may have greatly reduced lobiform or subquadrate tegmina. The sexes presumably have very different habits, the females probably fossorial or at least secretive, while the males may be night fliers, as is the case with many polyphagids. It is most unfortunate that we know nothing as to the exact locality or binomics of the remarkable West Indian member of the genus. The female sex of the latter is a great desideratum, as it doubtless is exceedingly different from the male in general appearance. In the male sex the West Indian species is strikingly similar to the South and East African *C. pardalina* (Walker), of which we have examined both sexes.

Calolamprea aliena, new species

Plate XVIII, Figures 5 and 7 to 9

When compared with the male sex of the African *C. pardalina* (Walker), the present species is seen to differ principally in the occipital interspace between the eyes being much narrower, about one and two-third times as great as occipital depth of eye, instead of two and one-half times as in *pardalina*, in the same region being without a transverse elevated line, which is present and produces a distinct angle in *pardalina*, in the less deplanate face, in the cephalic margin of the pronotum lacking the relatively broad subtruncation of *pardalina*, in the more strongly

¹Saussure's *Calolamprea bispinosa* has been made the type of the genus *Litopeltis* and removed to the Perisphærinæ, while the same author's *brevitarsis* is based in all probability on immature material and possibly represents a species of *Litopeltis*. Other forms described as species of the genus *Calolamprea* have since been placed in *Audreia*.

punctate discoidal and anal fields of the tegmina, in the straighter and less arcuate axillary veins of the tegmina, in the more arcuate anal sulcus of the same, in the less produced median section of the subgenital plate, in the short styles of the same, and in the shorter cerci. The dorsal half of the face in *pardalina* is sharply and solidly dark, while in *aliena* there is a far more restricted and less definite pair of dark blotches not extending ventrad of the ocelli.

The type of *aliena* has been much damaged in the past and is in such condition that it is dangerous to attempt to spread the tegmina and wings. The limbs are considerably damaged, but fortunately the important cephalic femora are intact.

TYPE.—Male; Haiti. (P. R. Uhler.) [Museum of Comparative Zoölogy.]

Size medium; form with a polyphagine suggestion, elongate, fully alate.

Head hidden under pronotum when seen from dorsum; cordiform, greatest depth subequal to width across eyes; interocular space extremely broad for the male sex, nearly twice as great as that between ocelli, its surface very weakly inflated on each side, these areas contiguous dorsad; ocelli well impressed, nearly circular, between them is placed a pair of small impressed puncta. Eyes not large, moderately lateral, their occipital margins gently arcuate, juxta-antennal margin of eyes rectangulate. Antennæ weakly hirsute.

Pronotum moderately transverse, subelliptical, greatest length contained one and one-third times in greatest width of same: cephalic margin regularly arcuate with the lateral margins, which are not differentiated; lateral angles narrowly rounded obtuse; caudal margin appreciably but not strongly produced, broadly rounded mesad, very faintly concave laterad: disk with a pair of subarcuate, irregularly spaced depressions outlining the disk, the most evident part of these being paired circular premedian impressions; lateral sections moderately deflexed cephalo-laterad; medio-caudal section with numerous transverse striatulations or folds.

Tegmina surpassing apex of abdomen by more than pronotal length, relatively broad: costal margin faintly sigmoid, gently arcuate proximad and much more strongly rounding to the apex distad: marginal field relatively narrow and elongate, reaching to point equal to two-fifths of entire pronotal length; anal field as extensive as marginal field: venation sharply defined and nervures fewer than in species of *Epilampra*; scapular field with rami of discoidal vein very closely placed; discoidal field with sectors more radiating than usual in genus; anal sulcus regularly arcuate, more flattened proximad; nervures of anal field about eight in number, regularly placed, more radiating than usual, but in general oblique subparallel and not converging distad, intercalary nervures of anal field very weak, thus producing distinct channels between principal nervures of field. Wings equalling tegmina in length; costal veins few, about six in number.

Abdomen relatively broad for the male sex; caudo-lateral angles of tergites bluntly angulate, hardly produced. Supra-anal plate transverse, subrectangulate, distal margin weakly arcuate, caudo-lateral angles well rounded.¹ Cerci depressed, blunt, sub-fusiform, about one and one-half times as long as supra-anal plate. Subgenital

¹Lateral portions curled dorsad in drying of type.

plate slightly asymmetrical, distal margin mesad arcuato-emarginate, sinistral angle rounded rectangulate, dextral angle rounded obtuse-angulate; styles very short, simple, relatively equal.

Cephalic femora with ventro-cephalic margin having four spaced large proximal spines and a single distal spine, the area between with a sparse series of brief spinules, which are more distant from each other proximad than distad; ventro-caudal margin unarmed except for a pronounced apical spine; caudal tibiae subequal to half of femora in length, moderately expanded, spines large, moderately curved, talpoid, flattened on flexor surface, several spines placed on external as well as those on extensor and flexor surfaces. Median and caudal femora with ventro-cephalic margin having three (median pair) or two (caudal pair) medium sized spines, also an apical one; ventro-caudal margins of same unarmed except for distal spine on the median pair. Median and caudal tibiae strongly spined. Caudal tarsi incomplete, metatarsus itself slightly less than one-half as long as tibia, biserially spinulose ventrad; pulvilli present and apical on all tarsal joints (one to four) remaining.

General base color ochraceous-buff to antimony yellow, passing to pale buckthorn brown on limbs and light ochraceous-buff on venter of abdomen. Dark pattern deep chestnut-brown to fuscous, distad on tegmina passing to russet, the disposition of pattern indicated below. Head virtually without dark punctulations, the interocular and interocellar region with a solid dark area, regularly shading off dorsad, contrasted ventrad with a meso-ventral triangular emargination extending dorsad and dividing the blotch for about two-thirds its depth; eyes pale clove brown; antennae appreciably infusate except proximad. Pronotum with a dense and sharply indicated dark pattern of punctulations and blotches, absent from the immediate vicinity of the lateral and cephalic margins, and mesad with a lyrate pattern indicated by blotches, a transverse series of four blotches disposed cephalad of the more lyrate center; vicinity of caudal margin with about ten short radiating lines, which reach to the margin itself. Tegmina with punctulations distinctly pantherine in type, covering virtually all except the pale immaculate marginal field; humeral trunk broadly and heavily infuscated, particularly in distal fourth, distad of this breaking into maculations. Wings appreciably infumate, except that the region of the costal veins is solidly of the pale base color. Abdominal tergites each with a transverse dark bar distad. Tibial spines russet.

Length of body, 16 mm.; length of pronotum, 5; greatest width of pronotum, 6.6; length of tegmen, 21.7; greatest width of tegmina, 7.

The type of this most interesting and remarkable species is unique. The discovery of the female is awaited with great interest.

Panchlorinae

The Panchlorinae is a group of cockroaches embracing forms often very diverse in appearance and in general above the average in size. Several of the genera, i.e., *Schizopelia* and *Schistopeltis*, are noteworthy in the Blattidae by reason of having the pronotum fissate or divided, in the former on each side at the lateral angle, in the latter cephalad on each side of the section dorsad of the head. Of the seventeen or so

genera of the subfamily, nine are tropical American, and three (*Leucophæa*, *Pycnoscelus* and *Nauphoeta*) are circumtropical and subtropical, but beyond doubt two, and probably all three, of these are of Old World origin. One of the American genera (*Panchlora*) is frequently transported in fruit to the United States and more rarely to Europe, but it has never established itself outside of the tropics.¹

In most of the species of this family there is little difference in the superficial external form of the sexes of one species. The immature condition, however, is often strikingly different, and its association with the adult frequently a difficult matter, so much so that in more than one case the immature stage has been described as a distinct genus.

It is very probable that parthenogenesis occurs in the widely distributed panchlorine genus *Pycnoscelus*, at least in America, though our evidence is entirely circumstantial yet very convincing. In *Panchlora* we find viviparity present, as is also true of certain genera of four other subfamilies of the Blattidæ.

KEY TO THE WEST INDIAN GENERA OF PANCHLORINÆ

1. Caudal margin of pronotal disk distinctly angulate produced mesad, covering the scutellum. Intercalated nervures of tegmina, when indicated, single in each interval between principal veins. 2.
- Caudal margin of pronotal disk transverse subtruncate, median projection very weak, exposing the scutellum. Intercalated nervures of tegmina generally three (in discoidal field) in each interval between principal veins. (Tegmina coriaceous; pronotum arcuate in transverse section; color never greenish; surface never highly polished.) *Nauphoeta* Burmeister.
2. Metatarsal pulvillus extending to or nearly to base of segment. Structure robust. 3.
- Metatarsal pulvillus distal, circular. Structure delicate. (General color translucent, clear greenish or rarely (in certain species) pale brownish. Body distinctly depressed.) *Panchlora* Burmeister.
3. Pronotum subdeplanate, lateral sections not broadly deflexed, but impresso-deplanate latero-cephalad. Tegmina coriaceous, subopaque; surface of pronotum and tegmina dull. Ulnar vein of wing with numerous (15 to 20) rami. (Pronotum and tegmina buffy, with pattern of pitch brown. Size large.) *Leucophæa* Brunner.
- Pronotum strongly arcuate in transverse section, lateral portions broadly arcuate deflexed. Tegmina semi-transparent; surface of pronotum and tegmina moderately polished. Ulnar vein of wing with fewer (approximately 10) rami. (Pronotum solid blackish, edged cephalad and laterad with buffy; tegmina chiefly bister of varying depth. Size relatively small.) *Pycnoscelus* Scudder.

¹At Brownsville, in extreme southern Texas, a species of this genus is endemic, living under perfectly natural conditions. Brownsville is in an arid tropical region.

Leucophæa maderæ (Fabricius)

[*Blatta*] *maderæ* FABRICIUS, 1781, 'Spec. Ins.,' I, p. 341. Madeira Islands.

Nauphoeta kükenethali SHELFORD, 1910, Zoolog. Jahrbücher, Suppl. XI, Heft 2, p. 107. ♂; Loango, near St. Thomas, Virgin Islands.

BAHAMAS.—Nassau, New Providence Island, 1 ♀, [Brooklyn Inst.].

CUBA.—Baños de Ciego Mantera, VI, 30, 1918, 1 ♀. San Lucas, Baracoa, Oriente Province, 1 ♂, [Davis Cln.]; Baracoa, IV, 1915, 1 immat. ind., [Davis Cln.].

JAMAICA.—Kingston, X, 24, 1913, (M. Hebard; in hotel larder), 1 ♂, [Hebard Cln.] Mandeville, Manchester Parish, elev. 2250 feet, I, 16–23, 1920, (F. E. Watson; in hotel), 6 ♂, 6 ♀. Montego Bay, XI, 1–2, 1913, (M. Hebard; on logwood docks), 1 ♀, [Hebard Cln.].

HISPANIOLA.—Port-au-Prince, Haiti, elev. about 300 feet, I, 15–23, 1922, (F. E. Watson), 2 ♀; III, 5–11, IV, 8–11, 1922, (F. E. Watson), 2 immat. ind. Puerto Plata, Dominican Republic, VII, 6, 1915, (F. E. Watson; on board ship after leaving port), 1 immat. ind. Sanchez, Dominican Republic, V, 11–16, 22–27, VI, 12, 1915, (F. E. Watson; in hotel or in vegetation of royal palms, guava, etc.), 1 ♂, 4 ♀, 1 immat. ind. Saona Island, VII–VIII, 1913, (R. H. N. DeBooy), 1 immat. ind.

PORTO RICO.—Manati, Department of San Juan, VI, 29, 1915, (Lutz and Mutchler; at auto lights on road to Ciales), 3 ♀. Rio Piedras, Department of Humacao, II, 24, 1912, (T. H. Jones), 1 ♀, [U. S. N. M.]. Mayaguez, Department of Mayaguez, II, 2, 1912, 1 ♀, [U. S. N. M.]. Baños de Coamo, Department of Ponce, XII, 28, 1914, (H. E. Crampton; at light on hotel veranda), 1 ♀. Culebra Island, II, 1899, (A. Busck), 4 ♂, 1 ♀, [U. S. N. M.].

DOMINICA.—Laudet, VI, 12, 13, and 22, 1911, (Lutz; under loose bark and banana sheaths and about house), 2 ♀, 1 immat. ind. Long Ditton, VI, 22, 1911, 1 immat. ind.

The synonymy of *Nauphoeta kükenethali* Shelford seems incontestable. The unique male individual on which the name was based was an alcoholic specimen, and probably teneral. The condition of the specimen was probably responsible for Shelford's failure to properly associate it. The description, down to minute details of the second abdominal tergite, the peculiar form of the pronotum and the formula of the apical spines of the femora, as well as the size, fully agrees with male material of *maderæ* from the West Indies.

This widely distributed tropical and subtropical species previously has been reported from a number of the West Indies, and it doubtless

occurs in suitable environments through most of the islands. It is a domiciliary species frequenting habitations, warehouses and other structures, at times very abundant and a serious pest. With all of its adaptiveness it apparently spreads rather slowly, as it does not appear to be established anywhere in the warmer portions of the United States, and its presence and distribution in the West Indies probably dates back to the days of the West African slave ships, which may have been the means of transport. Apropos of this Beauvois, in 1805, reported and figured the species (*Blatta major*) as from the "Iles de l'Amerique," probably specifically meaning Hispaniola. He states his belief that the species originated in Africa, and was imported into the colonies (presumably French) in America. In Central America it is of rare and very local occurrence, as is true of a considerable portion of South America. The genus is African, aside from this one species of much wider distribution, which probably has been largely disseminated through human agencies.

The previous West Indian records are from the Bahamas (Morse and Rehn), Grant Town, New Providence, Bahamas (Rehn); Cuba without exact data (Brunner), Guanajay in Pinar del Rio and Havana, Cuba (Rehn); "St. Domingo" (Serville and Walker, also by the latter as *Proscratea? illepida*, based on the immature condition); Jamaica (Walker); Porto Rico (Gundlach); Culebra Island (Rehn); St. Thomas (Shelford); St. Bartholomew (Hahn); Antigua (Marshall); Guadeloupe (Du Buysson)¹; St. Vincent (Brunner) and Barbados (Rehn).

The immature stages of this species are so distinctive in surface features, form and coloration that no difficulty in their recognition should be encountered.

***Pycnoscelus surinamensis* (Linnæus)**

[*Blatta*] *surinamensis* LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., p. 424. Surinam.

BAHAMAS.—Nassau, New Providence Island, 2 ♀, 3 immat. ind., [Brooklyn Inst.]. New Providence Island, XI, 20, 1912, 1 ♀. Fresh Creek, Andros Island, (W. M. Mann), 1 ♀, [U. S. N. M.].

CUBA.—Twelve and one-half kilometers south of Pinar del Rio, Pinar del Rio Province, IX, 12-13, 1913, (Chas. Leng), 1 immat. ind. Baños de San Vincente, seven kilometers north of Viñales, Pinar del Rio Province, IX, 16-22, 1913, (Lutz and Leng; in various situations), 4 ♀, 4 immat. ind. Fourteen kilometers north of Viñales, Pinar del Rio

¹Du Buysson, 1908, 'Orthoptères, Mission Chari-Lac Tchad.,' (1902-1904), Append., p. 708.

Province, IX, 16-22, 1913, (F. E. Lutz; in pine savanna), 1 ♀. Cabañas, Pinar del Rio Province, IX, 5-8, 1913, (Charles Leng; under decayed stalks of sugar cane and siftings in mangrove swamp), 2 ♀. Havana, IX, 5-6 and 9, 1915, 1 ♀, 1 immat. ind. Baños, Santa Clara Province, (Barnum Brown), 1 immat. ind. San Carlos Estate, near Guantanamo, Oriente Province, IV, 2, 1913, (C. T. Ramsden; under log), 3 ♀, 8 immat. ind., [A. N. S. P.]; X, 4-8, 1913, (F. E. Lutz), 2 immat. ind. Baracoa, Oriente Province, II, 5, 1915, 5 immat. ind., [Davis Cln.]. Juaco, Oriente Province, IV, 1915, 4 immat. ind., [Davis Cln.].

HISPANIOLA.—Sanchez, VI, 13-18, 1915, (F. E. Watson; at light), 1 ♀.

JAMAICA.—Montego Bay, St. James Parish, III, 6-16, 1911, (J. A. Grossbeck; under manure, bases of leaves of cocoanut palm, by sifting, etc.), 12 ♀, 30 immat. ind.; X, 28-31, 1913, (M. Hebard; two in bromeliads, others under litter), 4 ♀, 4 immat. ind., [Hebard Cln.]. Palm Beach, Montego Bay, St. James Parish, III, 3-17, 1911, (J. A. Grossbeck; under logs and stones on coral rock), 5 ♀, 2 immat. ind. Mandeville, Manchester Parish, XI, 6-7, 1913, (M. Hebard), 1 ♀, [Hebard Cln.]; elevation 2131 feet, XI, 26-28, 1919, (F. E. Watson; in hotel), 1 ♀, 3 immat. ind. Cumberland District, Clarendon Parish, elev. about 3000 feet, XII, 15-18, 1919, (F. E. Watson), 1 immat. ind. Grange Lane, St. Catherine Parish, X, 25, 1913, (M. Hebard; under limestone boulder), 1 immat. ind., [Hebard Cln.]. Stony Hill, St. Andrew Parish, X, 25, 1913, (M. Hebard), 2 ♀, 2 immat. ind., [Hebard Cln.]. Bath, St. Thomas Parish, III, 9, 1921, (C. C. Gowdey), 1 ♀, [Jamaica Dept. of Agr.].

PORTO RICO.—Playa Sardinera, Mona Island, II, 21-26, 1914, (F. E. Lutz; under wood), 1 immat. ind. Manati, San Juan, VI, 27-29, 1915, (F. E. Lutz and A. J. Mutchler; in rotted log), 1 ♀. Quebradillas, Department of Arecibo, 1, 3, 1915, (H. E. Crampton; under tiles and boards in stable yards), 4 immat. ind. Desecheo Island, II, 18-20, 1914, (F. E. Lutz; sifting in several situations), 1 ♀, 3 immat. ind.

VIRGIN ISLANDS.—St. Croix, (seashore), 1 ♀, [U. S. N. M.].

St. LUCIA.—Castries, IX, 10-22, 1919, (J. C. Bradley), 2 ♀, 2 immature ind., [Cornell Univ.].

This species is of very wide distribution within the tropics and subtropics, and is readily established in greenhouses, etc., in the temperate portions of the world. Adult males of the species are excessively rare, and, as far as known, none have ever been taken under natural conditions in the New World. In the very extensive series before us we have but

a single male, this taken on Lombok, one of the Sunda Islands, which has been described by Hebard in his study of the North American Blattidæ.¹ As has been suggested by that author, the species may be parthenogenetic and additional information upon this subject is awaited with great interest. The immature individuals have a very different appearance from the adults, and to the uninitiated would not be recognized as specifically identical with mature material.

The previous records of the species in the West Indies are from the Bahamas (Morse, Rehn), and specifically Grant Town, New Providence (Rehn); it occurs over all of Cuba (Gundlach, Bolivar and Rehn), having been recorded from localities extending from Pinar del Rio Province to the vicinity of Guantanamo; Jamaica (Walker, Rehn); Haiti (Walker and Palisot de Beauvois, and Saussure as *indica*); from Porto Rico by Gundlach, and specifically from Pueblo Viejo and Fajardo (Rehn); St. Thomas (Shelford), Antigua (Caudell), Dominica (Caudell), Guadeloupe (Lherminier), St. Vincent (Brunner), Grenada (Brunner) and Barbados (Rehn, Caudell).

The species will be found hiding under stones and loose trash, while the immature individuals burrow into the ground, frequently leaving the rough and cryptically formed and colored distal portion of the abdomen exposed at the ground surface.

PANCHLORA Burmeister

The specific taxonomy of the genus *Panchlora* hinges entirely on the disposition made of *Blatta nivea* Linnæus, the first described species referable to the genus. Shelford² has presented his conclusion as to the identity of the species. In short this is, that the sole specimen in existence which has any possible claim to being considered the Linnæan type, is a male in the DeGeer Collection at Stockholm. Shelford's reasons for regarding this DeGeerian material, of *nivea* as understood by that author, as the possible base for *nivea* of Linnæus are logical and warranted, and we accept them. The features he has given for the Surinam insect he considers *nivea* are sufficient to enable us to recognize it, and a considerable series is before us. It is, however, not a West Indian species, and no further discussion of it is needed at this writing.

Shelford³ has shown from the type of *Blatta virescens* Thunberg that this name was based on the same species as *nivea*, while Hebard⁴

¹1917, Mem. Amer. Entom. Soc., No. 2, p. 194.

²1908, Trans. Entom. Soc. London, (1907), pp. 456-458, 463-464.

³Vide *supra*, p. 463.

⁴1916, Ent. News, XXVII, p. 220, footnote 4.

has conclusively demonstrated that *Blatta chlorotica* Pallas is absolutely unidentifiable. Among the older names applied to forms of this genus is another as yet of uncertain status, i. e., *Blatta viridis* Fabricius, 1775. The type of this is not known to be in existence, and the description has not a single definite feature, either of character or geography, to assist in its location. Shelford¹ has given a single male cercal feature for the insect he calls *viridis*, but on what evidence he assumes the application of the name, no one knows. Without more explicit information we feel the only place for *viridis* is as an unidentifiable species of the genus. Without existing types or type localities to assist, it is hopeless to endeavor to assign these old names in a genus as difficult as any in the Blattidæ.

The following names have been used for West Indian records of the genus *Panchlora*, which, without actual examination of the material on which the records were based, we are unable satisfactorily to assign specifically. There is a very strong possibility that in most cases they relate to *P. cubensis*, the dominant West Indian species, but their arbitrary reference to that species would hardly be warranted.

P. nivea from "Antilles" (Olivier); Cuba (Girard, Brunner, Bolivar, Gundlach and Saussure and Zehntner); Jamaica (Brown); Porto Rico (Gundlach); Loango near St. Thomas (Shelford); Guadeloupe (Lherminier).

P. viridis from "West Indies" (Burmeister, Saussure); "Antilles" (Bolivar); Cuba (Walker, Girard, Bolivar, Gundlach, Brunner and Saussure); St. Domingo (Walker); Jamaica (Walker); Porto Rico (Gundlach); St. Vincent (Brunner); Grenada (Brunner).

P. virescens from Cuba (Guérin, Saussure and Saussure and Zehntner); Porto Rico (Rehn)²; Montserrat (Rehn).³

P. exoleta from "Antilles" (Therese von Bayern); Cuba (Saussure and Saussure and Zehntner); Jamaica (Brunner and Bolivar).

P. hyalina from Cuba (Saussure and Zehntner).

P. peruana from Cuba (Saussure and Zehntner).

P. prasina from Cuba (Girard).

The study of the present material shows conclusively the general assumption that black annulations on the antennæ in this genus are characters of permanence and primary importance, is incorrect. The presence or absence of black spots on the tegmina has been found to be unreliable, and the series of *Panchlora cubensis* and *sagax* (which see below) demonstrate as conclusively that the presence or absence of dark

¹Vide *supra*, p. 463.

²This material consists of a female in such poor condition that its specific reference is hardly warranted.

³This material has now passed out of our hands, so re-examination is not possible at this time.

antennal annulations is a character to be used with great caution, probably valueless as a general diagnostic features of groups of the genus.

Immature material of the genus, representing at least three instars, is before us from two localities in Cuba, two in Porto Rico and three in Dominica. The specific determination of such material is almost or quite impossible, at least when not accompanied by adult material, and this is the situation with most of the lots. The *Pycnosceloides* condition is well exemplified by this material,¹ but the form of the abdominal segments, and particularly of the supra-anal plate, will prevent confusion with the same stage of *Pycnoscelus*.

***Panchlora cubensis* Saussure**

P[anchlora] cubensis SAUSSURE, 1862, Revue et Magasin de Zoologie, (2) XIV, p. 230. ♀; Cuba.

P[anchlora] poeyi SAUSSURE, 1862, idem., p. 230. ♂; Cuba.

CUBA.—Cabañas, Pinar del Rio Province, V, 18-21, (Palmer and Riley), 4♂, 2 ♀, [U. S. N. M. and A. N. S. P.]²; IX, 5-6, 1913, (F. E. Lutz), 3 ♂, 2 ♀. Cayamas, Oriente Province, I, 8, II, 28, III, 18 and 31, V, 3, 20 and 31, VI, 6 (E. A. Schwarz), 5 ♂, 4 ♀, [U. S. N. M. and A. N. S. P.]³; IV, 17, 1905 (George Dimmock), 1 ♂, [M. C. Z.]. Sixty miles west of Santiago, Oriente, (H. M. Hiller), 1 ♂, [A. N. S. P.]². Cappare, Oriente Province, II, 20, 1914, (G. N. Wolcott; on cane leaves), 1 ♂, [U. S. N. M.]. Baracoa, Oriente Province, XI, 1915, 1 ♀, [Davis Cln.].

JAMAICA.—Montego Bay, St. James Parish, XI, 1-3, 1913, (M. Hebard; at light), 1 ♀, [Hebard Cln.]; XI-XII, 1913, (C. G. Hussey), 3 ♂, 1 ♀, [Hebard Cln.]. Kingston, St. Andrew Parish, 1 ♀, [A. N. S. P.]. "Jamaica," (H. G. Klages), 3 ♀, [U. S. N. M.].

PORTO RICO.—Aibonito, Department of Guayama, VIII, 14-17, 1914, (H. C. Barber), 1 ♀.

MONTSERRAT.—III-IV, 1894, (H. G. Hubbard), 1 ♀, [U. S. N. M.].

GRENADA.—No exact locality, VI, (A. Busck), 1 ♂, 1 ♀, [U. S. N. M.]. No exact locality, (Mrs. W. E. Broadway), 1 ♀, [Hebard Cln.].

This species is the dominant one of the genus in the West Indies, particularly in the Greater Antilles, and it is also widely distributed in Mexico, Central America and northern South America. It is the one most frequently encountered adventive in the United States, particularly

¹1921, Hebard, Trans. Amer. Entom. Soc., XLVII, p. 144.

²Recorded by Rehn (1903, Trans. Amer. Entom. Soc., XXIX, p. 284) as *P. peruana*, the locality given in error as "Habana Province." Later that author (1909, Second Rep. Cent. Exper. Sta. Cuba, p. 189), reported the same material as *P. nivea*.

³Recorded by Rehn (1909, Second Rep. Cent. Exper. Sta. Cuba, p. 189) as *P. peruana*.

the eastern states, to which it is regularly transported in cargoes of bananas. The characters of the species and some features of its variability have been set forth by Hebard in his study of the North American Blattidæ.¹ That author has there shown the vast amount of divergence of opinion and contradiction in the names given in the literature of the adventive North American records of *Panchlora*, almost all of which really refer to the present insect. The literature of the species as a West Indian insect is far worse in this respect, and we have already referred to the number of records of West Indian *Panchlora* which cannot definitely be referred to any one of the species here recognized, although probably in most every case the present insect is one which was before the recorder.

The synonymy of *poeyi* under *cubensis*, established by Hebard,² is clearly evident, as the two names were based on opposite sexes of the same insect, *cubensis* having line priority. Where material has been recorded as *cubensis* or *poeyi*, or where a re-examination of the material shows it to be *cubensis*, we have included the references in our geographic summary below. In the other cases, where there is a possibility that *cubensis* might not have been intended, the references have been given above under the generic discussion.

The Aibonito, Porto Rico female has decided dark annuli on the antennæ, present at about distal sixth. The specimen is otherwise perfectly typical *cubensis*, with the interspace between the eyes equal to one-half of the supra-ocular depth of eye.

The present series well illustrates the size variation in this species, demonstrated by Hebard³ from Panamanian material. All of the specimens before us are within the extremes given by him, except that the Grenada female surpasses the maximum given for that sex, having the following dimensions: length of body, 21.5 mm.; length of pronotum, 6.5; greatest width of pronotum, 7.9; length of tegmen, 23; greatest width of tegmen, 7.1.

The previous records of *cubensis* and *poeyi* are all of Cuban material, thus the records detailed above from Jamaica, Porto Rico, Montserrat and Grenada are the only positive records of the species from outside of Cuba. The species probably will be found in most all of the islands; as it is common and omnipresent. Gundlach states that Cuban members of the genus live by preference under the loose bark of trees, while Hebard found this species attracted to lights at night.

¹1917, Mem. Amer. Entom. Soc., No. 2, pp. 198-199, 270-271, Pl. VIII, figs. 2-5.

²1916, Ent. News, XVII, p. 220.

³1919, Mem. Amer. Ent. Soc., No. 4, p. 105.

***Panchlora antillarum* Saussure**

Plate XIX, Figures 5 to 7

P[anchlora] antillarum SAUSSURE, 1862, Revue et Magasin de Zoologie, (2) XIV, p. 230. Sex? (later given as female minus the end of the abdomen); Cuba.

HISPANIOLA.—Higural, Dominican Republic, IV, 10, 1913, (J. R. Johnston), 1 ♂, 1 ♀, [U. S. N. M.]. Villa Rivas, Dominican Republic, VI, 22, 1915, (F. E. Watson; in cultivated grounds, palms, fruit, etc.), 1 ♀. Sanchez, Dominican Republic, VI, 7-12, 1915, (F. E. Watson), 1 ♀.

The specimens here recorded have necessitated thorough consideration of the literature, and their reference to *antillarum* has been decided upon only after considerable deliberation. Saussure's *antillarum* was described from a single individual, of which the sex was not indicated, but subsequently Saussure tells us that it was a female, although at a later writing Saussure and Zehntner state it was minus the abdomen. The principal features originally emphasized were the great interval between the eyes, the caudal margin of the pronotum much angulate, the lateral margins of the pronotum opaque and green and the tegmina little surpassing the abdominal apex. The length, with tegmina, was said to be twenty millimeters. In 1864, Saussure¹ somewhat elaborated his previous description, bringing out the fact that the pronotum is more inflated, when compared with the *nivea* type, and that the eyes are separated by an interspace almost a millimeter wide. In 1893, Saussure and Zehntner² supplied a few additional remarks, briefly amplifying what had previously been stated, and also given important measurements of the pronotum. Apparently Saussure had never seen any material of the species other than the type, as in 1893 Saussure and Zehntner speak solely of the type.

It is evident that in at least one feature the original description and that of 1864 have presented a condition which exists in no normal *Panchlora*, i. e., the posterior margin of the pronotum "acute angulato" (1862), or with "un angle vif, nullement arrondi" (1864). In 1893, this margin is said to be "postice angulatum." It is evident the condition described originally is not a normal one for this genus, as from our experience with forms of *Panchlora* the angle of the margin in question is rounded and never acute. It is possible the scutellum might have been mistakenly described as the apex of this marginal angle, or that the type is an abnormality. The great interval between the eyes, equalled in no West Indian form and found in both sexes, is an important diagnostic

¹ Mém. Mex. Blatt., p. 193.

² Biol. Cent.-Amer., Orth., I, p. 94.

feature of this species, even considering the known variability of this character in *P. cubensis* and other species. The opacity of the lateral margins of the pronotum is an uncertain feature, as its absence is frequently due to a rather teneral condition of the specimen, and also the strength of the green coloring of the heavy chitin in this genus is a matter of variation. The large pronotum, however, combined with stocky build and relatively short tegmina, is diagnostic when considered with the great interocular space.

Hebard, in 1916, believed¹ *antillarum* to be an evident synonym of *cubensis*, but this conclusion was reached before the present material was in our hands, and but a single pale green species from the Greater Antilles was before him.

Compared with *P. cubensis* the present species can be distinguished by the greater interspace between the eyes, proportionately heavier and broader pronotum, relatively shorter tegmina and wings and distinctive male genitalia. The latter are shown in Plate XIX, figure 6, while the male genitalic features and the interocular space of both sexes of *cubensis* have been well figured by Hebard.²

The published measurements and those of the present individuals are as follows.

	Length of Tegmina	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♀, Cuba, type, <i>ex</i> Saussure, 1862.....	20				... mm.
♀, Cuba, <i>ex</i> Saussure, 1864.....	19.5	16			16.2
♀, Cuba, <i>ex</i> , Saussure and Zehntner, 1893..	21		5.5	7	16.5
♀, Rivas, Dominican Republic.....	20.5	17	5.6	7.1	17.3
♀, Sanchez, Dominican Republic.....	24.3	18.5	6	7.5	20
♀, Higurál, Dominican Republic.....	23	21	5.5	6.9	19.5
♂, Higurál, Dominican Republic.....	17.5	17	4.6	5.8	14.2

¹Entom. News, XXVII, p. 220, footnote 6.

²1917, Mem. Amer. Entom. Soc., No. 2, Pl. VIII, figs. 3, 4 and 5.

No author since the time of the original description, except the original describer and himself and Zehntner, has added anything to our knowledge of this species. Subsequent records of it from Cuba are mere quotations or repetitions of the original, except that Bolivar states it occurs in Durango, Mexico, which we are inclined to doubt. Whether any of the numerous records of *peruana*, *exoleta*, *poeyi*, *viridis*, *virescens* and *nivea* from the West Indies relate to *antillarum*, as here understood, we are unable to say.

The species may be peculiar to Cuba and Hispaniola and, on the former island, it may be of very limited distribution, but not a single exact locality is known for it other than those here given.

***Panchlora sagax*, new species**

Plate XIX, Figures 1 to 4

More closely allied to *P. peruana* Saussure and *P. colombiæ* Hebard than any other species not possessing black lineations on the pronotum. Our interpretation of *peruana*, described from Moyabamba, Peru,¹ is from individuals of both sexes from Chanchamayo, Peru, and in the collection of the Academy of Natural Sciences of Philadelphia. From these *sagax* differs in the slightly more prominent lateral angles of the pronotum, slightly less produced caudal angle of the same, the proportionately shorter tegmina and wings, and distinctive genital features of both sexes.

To *colombiæ*, *sagax* is closely related, but it differs in the distinctive genital features in both sexes, particularly in the male, and the shorter tegmina and wings. The male genitalic features of *colombiæ* were figured by Hebard in the plates accompanying the original description.²

TYPE.—Male; Long Ditton, near Roseau, Dominica, West Indies. June 20, 1911. (F. E. Lutz; at light in house.) [American Museum of Natural History.]

Size medium; form more robust than usual in genus; surface as usual for genus.

Head from dorsum very narrowly visible cephalad of pronotum. Facial aspect with head broad; eyes large; interspace between eyes narrow, equal to one-fourth of supra-ocular depth of eye.

Pronotum moderately transverse, greatest width slightly greater than median length: cephalic and lateral margins cephalad of point of greatest width strongly and quite regularly arcuate; lateral angles obtuse, but with a distinct and narrowly rounded angulation; caudal margin arcuate obtuse-angulate, mesad not at all produced; lateral portions of pronotum relatively broad, but moderately deflexed.

Tegmina and wings surpassing apex of abdomen by distance equal to greatest depth of head.

¹1864, Rev. et Mag. de Zool., (2) XVI, p. 342.

²1919, Trans. Amer. Ent. Soc., XLV, p. 115, Pl. xviii, fig. 3.

Supra-anal plate sub-rectangulate transverse; distal margin subtruncate, laterad rather broadly arcuate to lateral margins of plate, mesad with slight and shallow, though relatively broad, emargination. Cerci simple, subdepressed, tapering, surpassing distal margin of supra-anal plate by about one-third of cercal length; ultimate joint enlarged, apex rounded; penultimate joint very faintly longer than antepenultimate one. Subgenital plate moderately asymmetrical, obliquely sinuato-truncate dextrad, sinistrad and distad moderately subundulato-arcuate, as shown in figure 1; styles simple, about one-half length of cercus.

Tibiæ strongly spined; caudal tibiæ with longest distal spine falling but little short of apex of caudal metatarsus. Caudal metatarsus slightly longer than remaining tarsal joints combined.

ALLOTYPE.—Female; Laudet, Dominica, West Indies. June 12, 1911. (Miner; from rotten wood and wood powder.) [American Museum of Natural History.]

The following features are those of difference from the description of the male.

Interspace between eyes equal to four-fifths of supra-ocellar depth of eye.

Supra-anal plate with margin regularly arcuate, mesad deeply fissate, margins of fission sharply rounded into general plate outline. Cerci tapering, falling short of distal margin of supra-anal plate, ultimate joint moderately elongated, apex rounded. Subgenital plate broad, very ample, margin in general broadly arcuate, faintly concave ventrad of cerci, mesad the margin is rather broadly subtruncate.

General color of the clear thalassine green usual in the species of the genus, in the areas of concentrated pigment being paris green of Ridgway ('Color Standards'). Pale lining of humeral trunk of tegmina and pronotal continuation of same found in numerous species of the genus, not at all indicated. Head light ochraceous-buff; interspace between eyes english red (Ridgway) to mars orange; antennæ buffy at base, passing to pale zinc orange, with or without dark annulus embracing two to four joints at distal fifth or sixth; eyes mottled bister and dresden brown.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♂, San Juan, Porto Rico.....	10.3	3.6	4.4	12.2 mm.
♂, Rio Piedras, Porto Rico.....	12.5	3.7	4.8	13.3
♂, Culebra Island, Porto Rico....	11.5	3.8	4.6	11.7
♂, Long Ditton, Dominica, type..	14.1	4	5	14
♂, Long Ditton, Dominica, para- type.....	15	4.4	5.7	14.8
♀, Rio Piedras, Porto Rico.....	15.4	4.3	5.7	15.6
♀, Rio Piedras, Porto Rico.....	15	4.1	5.4	15
♀, Laudet, Dominica, allotype....	20	5.7	7.2	19.6
♀, Long Ditton, Dominica, paratype	16.8	5.4	6.6	18

In addition to the type and allotype we have before us the following material.

San Juan, Porto Rico, 1907, (P. Serre), 1 ♂, [Paris Museum].

Rio Piedras, Department of Humacao, Porto Rico, V, 1, (G. N. Wolcott; at light), 1 ♂, [Porto Rico Department of Agriculture].

Loiza, Department of Humacao, Porto Rico, (bred at Rio Piedras, XI, 16, 1922, from female taken at Loiza in rotten cocoanut palm), 2 ♀, [Porto Rico Department of Agriculture].

Adjuntas, Department of Aguadilla, Porto Rico, IV, 12, 1900, (C. W. Richmond), 1 ♀, [U. S. N. M.].¹

Aibonito, Department of Guayama, Porto Rico, VII, 14-17, 1914, (H. G. Barber; beating), 1 ♀.

Culebra Island, Porto Rico, II, 1899, (A. Busck), 2 ♂, 2 ♀, [U. S. N. M.].²

Dominica, VI-VII, (H. W. Foote; Yale Dominican Exped.), 1 ♂; (A. H. Verrill), 1 ♀, [U. S. N. M.].³

Long Ditton, near Roseau, Dominica, VI, 18-20, 1911, (Lutz and Miner; at light in house, and from decaying stump in banana patch), 4 ♂, 2 ♀, *paratypes*, [A. M. N. H., A. N. S. P., and Hebard Cln.].

Laudet, Dominica, VI, 12 and 13, 1911, (Lutz and Miner; in rotting wood), 1 ♂, 5 ♀, *paratypes* [A. M. N. H., A. N. S. P., and Hebard Cln.].

This interesting species is apparently of South American origin and probably its line of migration or extension has been northward through the Lesser Antilles. The genitalic features of the male are quite distinctive, and in that sex no great difficulty should be encountered in the recognition of the species, when proper allowance is made for the exasperatingly similar general form and coloration of the greenish species of the genus.

The size is seen to be variable, although it would seem that material from Dominica is uniformly larger than individuals from Culebra and Porto Rico. The two females from Dominica measured above represent the extremes of the series of that sex from the island, but the minimum may be abnormally small, as it is a dried alcoholic specimen and slightly shrunken. The interspace between the eyes in the male sex varies from as much as one-third to as little as one-seventh of the supra-ocular depth of the eye, while in the female its range is more limited—from four-fifths as great as to slightly more than this depth of the eye. The male genitalic features are quite constant, although specimens dried and discolored from alcohol, one from Culebra and the other from San Juan, Porto Rico, exhibit a curling of the supra-anal plate which is quite deceptive at

¹Recorded by Rehn as *P. hyalina* (1903, Trans. Amer. Entom. Soc., XXIX, p. 285).

²Recorded by Rehn (1903, Trans. Amer. Entom. Soc., XXIX, p. 131) as *P. peruana* and *exoleta*, which species, as far as material now available is concerned, are not found in the West Indies.

³Recorded by Caudell (1914, Proc. U. S. N. M., XLVII, p. 491), as *P. hyalina*.

first glance. Careful examination, however, shows this is due to the condition of the specimen, and in the remaining *Culebra* male, which has not been immersed, the supra-anal plate is undistorted and identical in form with that found in *Dominica* males.

An analysis of the specimens before us, possessing sufficiently complete antennæ to be useful in determining the constancy of the presence of blackish annuli on the same, shows the results tabulated below. We have indicated those dried from alcohol in order to show that this condition has not been responsible for the presence or absence of these markings.

Rio Piedras, Porto Rico. One male—Annuli.
 Rio Piedras, Porto Rico. One female—Annuli.
 Adjuntas, Porto Rico. One female—Annuli.
 Culebra Island. One male—No annuli.
 Culebra Island. One female—Annuli.
 Dominica. One male—Annuli.
 Dominica. One female—No annuli.
 Long Ditton, Dominica. One male—No annuli. (Alc.)
 Long Ditton, Dominica. One male—No annuli.
 Long Ditton, Dominica. One female—Annuli. (Alc.)
 Long Ditton, Dominica. One female—No annuli. (Alc.)
 Laudet, Dominica. One male—No annuli.
 Laudet, Dominica. One male—No annuli.
 Laudet, Dominica. One female—Obscure annuli present. (Alc.)

It will be seen from the above that neither sex, condition of specimen, nor general locality appear to be correlated with this feature, which can only be considered one of individual variation.

***Nauphoeta*¹ *cinerea* (Olivier)**

Blatta cinerea OLIVIER, 1789, 'Encycl. Méthod.,' IV, p. 314. Isle of France-Mauritius.

HISPANIOLA.—Sanchez, Dominican Republic, VI, 7-12, 1915, (F. E. Watson), 1 ♂.

This quite prettily marked species is of wide distribution within the tropics of both hemispheres. In America it is known from the Galapagos Islands and Mazatlan, Mexico, on the west, and several localities in Brazil, "Mexico," Cuba and Hispaniola. Walker in 1868 recorded the species from the latter island, without exact locality, while it was recorded from Cuba by Saussure as long ago as 1864. The only exact Cuban

¹Relative to the status of *Nauphoeta kükenhali* Shelford (1910, Zoolog. Jahrbücher, Suppl. 11, Heft 2, p. 107), described from the island of Loango, near St. Thomas, Virgin Islands, reference is made to our comments under *Leucophaea maderae*, of which *kükenhali* is clearly a synonym.

records are from Havana and Cardenas, both given by Gundlach. Doubtless when our knowledge of the West Indian Blattidæ is more complete the present insect will be found to occur in a number of the islands, as it appears to be readily transported by commerce, and of sufficient adaptability to establish itself thoroughly in a new environment. The genus is an African one and the original home of the species was probably Ethiopian or Malagasian.

***Nauphoeta occidentalis* (Fabricius)**

[*Blatta*] *occidentalis* FABRICIUS, 1793, 'Entom. Syst.,' II, p. 7. "In Americæ Insulis."

As Shelford has already shown¹ from an examination of the type of *occidentalis* in the Copenhagen Museum, this species is the same as that much more recently described as *Rhyparobia rufipes* Kirby, and is a West African insect. The type bears a written label, "St. Thomas Is.," and Shelford suggests the West African island of San Thomé was intended, and that Fabricius confused this with St. Thomas of the Virgin Group of the West Indies. Fabricius credits the material of Dr. Pflug, who placed in his hand, as witnessed by a perusal of Fabricius' pages, collections from localities as diverse as Tranquebar, East Indies, China, Sierra Leone, Copenhagen and "Insulæ St. Crucis Americæ." We are unable to secure any definite information regarding Dr. Pflug, but it is evident from the above localities that he possessed material from St. Croix and also West Africa (Sierra Leone), in fact the majority of the acknowledgements to him are records of the latter category. As further evidence of the clearly West Indian source of at least some of his material, the late Dr. Henry Skinner called our attention to the case of the hesperiid butterfly *Atrytone vitellius* (Fabricius), reported originally from the same region as *Blatta occidentalis*, and credited to Dr. Pflug. This species is, as far as known to-day, restricted to the Virgin Islands, and a figure of the type of Fabricius in the British Museum fully agrees with material from St. Thomas and St. Croix taken by modern collectors. This evidence is presented merely to show it cannot be assumed the locality is incorrect, although we feel the original material did not come from the West Indies. On the other hand, if introduced from Africa into the Virgin Islands as long ago as the latter part of the eighteenth century, in all probability the species would have spread or specimens would have been secured since, in view of the known adaptability of the related *N. cinerea*. It

¹1908, Trans. Ent. Soc. London, p. 468.

also is more than possible the original material came from Sierra Leone and was confused with specimens from St. Thomas, West Indies, before passing into the hands of Fabricius. Until more is known concerning the species as a West Indian insect it would seem best to present the evidence and withhold comment.

In addition to the species of the Panchlorinæ treated above, three South American members of that subfamily have been credited to Cuba, on the bases of old records which we feel are, beyond any question, erroneous, or are of accidental importations which did not become established. We believe that certain series possessed by some of the earlier authors were erroneously labelled as from Cuba. The frequency with which this situation has been encountered, in the case of species since unreported from that island, more firmly establishes this conclusion. This is particularly true of a number of species reported by Guérin-Ménéville in La Sagra's great work.

Tribonium spectrum (Eschscholtz)

Blatta spectrum ESCHSCHOLTZ, 1822, 'Entomographien,' p. 85. Santa Catharina, Brazil.

This species is a native of Southern Brazil and Paraguay. Serville¹ credited the synonymous *Blatta conspersa* to Cuba, citing material in the collections of Lefebvre, Dejean and himself. Probably the original source of all was the same, as no subsequent author has given any additional Cuban information. Guérin-Ménéville states he did not have the species from Cuba; Saussure, in 1864, remarks that it was probably imported into Cuba from Brazil, while Gundlach states, "Neither I, nor any other collector has observed this species in this island." All other mentions of the species as a Cuban insect are evidently mere uncommented citations of Serville's record.

Zetobora emarginata Burmeister

Z[etobora] emarginata BURMEISTER, 1838, 'Handb. der Entom.,' II, Abth. II, pt. 1, p. 511. [♂]; Pará, Brazil.

Hebard² has recently established the synonymy of *Zetobora cicatricosa* Burmeister with *emarginata*, the two names being based on sexes of the same insect. Guérin-Ménéville³ recorded this species from Havana, Cuba, on the basis of a specimen said to have been taken by Poey. This

¹1839, 'Hist. Nat. Ins., Orth.,' p. 89.

²1921, Proc. Acad. Nat. Sci. Phila., 1921, pp. 209.

³In La Sagra, 1857, 'Hist. Phys. Polit. et Nat. l'île de Cuba, Anim. Artic.,' p. 336.

record is quoted by Brunner in 1865 and given as Cuba by Walker in 1868, but Bolivar in 1888 states, "I have not seen in nature this species, which also inhabits South America." Gundlach's comment is more to the point. "It is very probable that it does not exist in Cuba." The species is one of the Guianas and Amazonian Brazil.

Schizopelia fissicollis (Serville)

Blatta fissicollis SERVILLE, 1839, 'His. Nat. Ins. Orth.', p. 85. Cayenne.

This very remarkable blattid, which possesses a pronotum having lateral fissations, is an inhabitant of the Guianas. Guérin-Ménéville in his discussion of *Blatta cicatricosa*, comments upon the synonymy of *fissicollis* under *cicatricosa* (*Zetobora emarginata*), as had been suggested by Serville, shortly after describing *fissicollis*. Guérin-Ménéville there reached the conclusion the two insects were very different and, to show the difference between them, gave a figure of each.¹ Unfortunately he failed to mention where his individual of *fissicollis* was from, merely stating, "je possède et représente ici un exemplaire de la vraie *Bl. fissicollis* Serville, et réellement il n'y a aucun rapport entre elle et la *Cicatricosa*." After this follows in a separate paragraph, "Cette espece m'a été envoyée de la Havane par M. Ph. Poey. . . ." The last statement is unfortunately rather ambiguous, and it has produced considerable confusion and error. Logically, it applies to *cicatricosa*, and so we have considered it above, but it has been used as a basis for the occurrence of *Schizopelia fissicollis* in Cuba. Brunner² began the confusion by recording *cicatricosa* from "Havane (Guér.)," and also crediting *fissicollis* to the "Île de Cuba (Guér.)." Bolivar, in 1888, comments, "La *Z. fissicollis* Serv. signalée par Guérin à l'île de Cuba et figurée sur la pl. 12, fig. 7, de l'ouvrage de La Sagra, ne se trouve pas à Cuba." Hebard³ has commented upon the incorrectness of the Cuban record of *fissicollis*.

Blaberinæ

A cursory study of the genera referred to this subfamily shows conclusively that the usual arrangement of them is in large part incorrect, as it is quite evident that we have at least three lines of development or phyla, which are as follows: (1) comprising *Archimandrita*, *Blaberus* and *Eublaberus*; (2) comprising *Blaptica*, *Byrsotria*, *Hemiblabera*, *Aspiduchus* (described below) and *Monachoda*; (3) containing *Monastria*

¹Idem, Pl. XII, figs. 5 (*cicatricosa*) and 7 (*fissicollis*).

²1865, 'Nouv. Syst. Blatt.', pp. 291-292.

³1921, Proc. Acad. Nat. Sci. Phila., 1921, p. 209.

and *Petasodes*. The first group is well defined, although relationship with *Byrsotria* is evident. The tegmina and wings are always well developed, the pronotum elliptical and the caudal margin of the same never straight. The second group is well defined from the first, but whether *Monachoda* should be considered the maximum differentiation of the second group, or a less highly modified member of the third one, is a matter of opinion. The second group has the tegmina and wings greatly reduced in the female, or in both sexes (*Hemiblabera* and *Aspiduchus*), the pronotum transversely truncate caudad in the female or in both sexes (*Hemiblabera* and *Aspiduchus*), while a progressive flattening of the pronotum reaches its maximum condition in *Aspiduchus*. *Monachoda* has fully developed tegmina and wings in the male sex and a greatly depressed pronotum, which, however, retains a generally acute elliptical form. The third division is characterized by possessing fully developed alar organs in the male sex (*Monastria*) or in both sexes (*Petasodes*), and also a cucullate pronotum, which in *Petasodes* is remarkably developed. The genus *Cacoblatta* Saussure is unknown to us, and at this time we do not care to hazard an opinion as to its position.

The linear arrangement we prefer to follow is: *Archimandrita*, *Blaberus*, *Eublaberus*, *Blaptica*, *Byrsotria*, *Hemiblabera*, *Aspiduchus*, *Monachoda*, *Monastria* and *Petasodes*.

KEY TO WEST INDIAN GENERA OF BLABERINÆ

1. Both sexes fully winged. Pronotum with caudal margin convex in the female sex. (Pronotal form similar in both sexes, transversely ovate-elliptical.)
Blaberus Serville.
 Female sex always with tegmina not exceeding middle of dorsum of abdomen; male sex fully alate or with alar organs as in female. Pronotum of female with caudal margin transversely truncate.....2.
2. Pronotum of male differing from that of female, transverse ovate-elliptical in shape. Pronotum of female semicircular in outline. Tegmina and wings of male surpassing, equalling or falling somewhat short of apex of abdomen. (Tegmina of female sharply docked, transversely sinuato-truncate distad.)
Byrsotria Stål.
 Pronotum of male similar to that of female, semicircular in outline. Tegmina abbreviate in both sexes, not surpassing the middle of the abdomen.....3.
3. General form and particularly pronotum not strongly deplanate. Tegmina not reaching to middle of abdomen, distal margin transversely subtruncate to weakly oblique (♂) or markedly oblique subtruncate (♀). Marginal field of tegmina proximad equal to one-third of greatest width of tegmen. Cephalic tibiæ relatively heavy, subfossorial in type.....*Hemiblabera* Saussure.
 General form and particularly pronotum strongly deplanate. Tegmina reaching to middle of abdomen, distal margin well arcuate. Marginal field of tegmina proximad equal to almost one-half of greatest width of tegmen. Cephalic tibiæ more slender, cursorial in type.....*Aspiduchus*, new genus.

BLABERUS Serville

Like many other genera the forms of which are variable and the specific features hard to ascertain and express, the genus *Blaberus* has been a despair to the systematist. The first really constructive work was done by Hebard,¹ and his studies in 1916 made it possible to approach certain species of the genus with the realization that the confusion of the past had to an extent been dissipated. Some finality in nomenclature has now been achieved, certain of the species clearly defined and in a measure intra-specific variation in the genus ascertained.

It is evident from the material in hand, and from a study of the literature, that we have but two species of the genus in the West Indies, although the literature credits nine specific names to the fauna of those islands. Some of these are synonyms, others based on material not West Indian (as Saussure's record of *minor*), while a number are erroneous identifications, which it is now possible to correct. The two West Indian species are of considerable interest, in that one (*craniifer*) is known from Cuba and elsewhere, Mexico southward through Central America, while the other (*discoidalis*) is known from all the Greater Antilles and northern South America, west to Panama. It would seem that the two species reached the Greater Antilles by opposite routes, and that *craniifer* is probably the more recent arrival.

From the Lesser Antilles we have no material of the genus, or for that matter any record of value. Lherminier, in 1837, reported by name only, *Blatta gigantea* from Guadeloupe, but what species was intended is very doubtful, as at the time that specific name was used for almost any member of the genus.

One specific name has figured to a considerable extent in the literature of West Indian *Blaberus*, which certainly has no real claim to be so included. This is *Blatta (Blabera) sulzerii* Guérin.² The name was based on a single individual supposed to be from Cuba, and also considered to be identical with that figured, in 1776 by Sulzer, and then said to be from Surinam. Sulzer's figure,³ Guérin's description and Saussure's redescription and figure of Guérin's type in the Geneva Museum⁴ show conclusively that *sulzerii* is a member of the genus *Eublaberus* Hebard,⁵ a Central American and South American group, no member of which is

¹'Critical Notes on Certain Species of the Genus *Blaberus* (Orthoptera, Blattidæ),' 1916, Entom. News, XXVII, pp. 289 to 296, Pl. xv. 'The Blattidæ of North America North of the Mexican Boundary,' 1917, Mem. Amer. Entom. Soc., No. 2, pp. 200 to 205.

²In La Sagra, 1857, 'Hist. Phys. Polit. et Nat. de Cuba, Anim. Artic.,' p. 334.

³*Blatta surinamensis* Sulzer (not of Linnæus) 1776, 'Abgekürzte Geschichte der Insekten,' I, p. 77, Pl. viii, fig. 1.

⁴1864, Mém. Hist. Nat. Mexiq., I, pt. 3, p. 239, Pl. II, fig. 39.

⁵1920, Mem. Amer. Entom. Soc., No. 4, p. 116.

known from the West Indies. Added weight is thus given to the very questionable character of a number of Guérin's supposed Cuban records, quite a few of which point to the Guianas, and possibly Cayenne, as their probable source. In consequence we are not considering *sulzerii* as a West Indian insect.

The two West Indian *Blaberus* may be separated by the following features.

Size smaller; form robust. Pronotum proportionately larger compared with general bulk. Pronotal maculation solid, without pale areas. Tegmina with internal boundary of marginal field weakly sigmoid; width of marginal field no more than one-half of greatest width of anal field; pale areas of tegmina not limited to proximal portions of marginal and anal fields; entire anal field pale even in darkest individuals. (Greater Antilles, northern South America, Panama.)

discoidalis Serville.

Size larger; form less robust. Pronotum proportionately smaller compared with general bulk. Pronotal maculation with small pale areas which form a pattern crudely resembling a human face (rarely absent). Tegmina with internal boundary of marginal field markedly sigmoid; width of marginal field more than one-half of greatest width of anal field; pale areas of tegmina limited to proximal portions of marginal and anal fields, and occasionally an area mesad in discoidal field. (Cuba, Mexico and Central America.).....*craniifer* Burmeister.

***Blaberus discoidalis* Serville**

Plate XIX, Figure 8

Blabera discoidalis SERVILLE, 1839, 'Hist. Nat. Ins., Orth.,' p. 76, Pl. I, fig. 6. ♀; Santo Domingo.

HISPANIOLA.—Puerto Plata, III-V, 1916, V, 7-8, VII, 6, 1915, (F. E. Watson and N. L. Orme, Jr.; taken in houses and on board ship), 1♂, 2♀. Fortaleza San Luis, Santiago [de los Caballeros], II, 2, 1919, (H. B. Sherman), 1♀, [Mus. Zool. Univ. Mich.].

JAMAICA.—Kingston, VIII, 1, 1913, (Wm. Harris), 2♂, 5♀, [Hebard Cl. and U. S. N. M.]. Ferry River, Liguanea Plain, VII, 5, 1920, (Rehn; under dead cocoanut petioles in open spot), 1♂, 1 immature ♀, [A. N. S. P.].

The synonymy of this species has been carefully studied by Hebard, to whose paper² the student is referred for the detailed information. The names *Blabera cubensis* Saussure and *Blabera rufescens* Saussure and Zehntner, as well as part of *Blabera varians* Serville (♂), and *subspurcata* Walker, refer to this species.

¹Reported by Hebard, 1916, Entom. News, XXVII, p. 294.

²Idem, p. 296.

Discoidalis is the most widely distributed species of *Blaberus* in the West Indies, being known from all of the Greater Antilles and Vieques Island. The records have been so confused that it is best to cite them with the identifications there given. We have examined all of them and satisfied ourselves of the correctness of the association here made. The previous general records are from Cuba (Serville as *varians*, Brunner as *trapezoidea*, Saussure as *cubensis* and *trapezoidea*, Bolivar and Gundlach under the same names, Saussure and Zehntner as *trapezoidea* and *rufescens* and Rehn [solely from the literature] as *trapezoidea*, *cubensis* and *rufescens*); Jamaica (Drury as *gigantea*, Brunner as *atropos*); Hispaniola (Serville as *discoidalis* and *atropos*, Walker as *subspurcata*); Porto Rico (Rehn as *rufescens*, Sein and Wolcott as *discoidalis*, Wolcott as *cubensis*). Gundlach specifically reported the insect from Magua, in the valley of Trinidad, Cuba, while Hebard has credited it to Vieques Island. Its range elsewhere extends from Panama eastward through Colombia and Venezuela to the island of Trinidad.

Hebard has given extensive notes on the size and color variation of the species.¹ All we know concerning the habits of the species in the West Indies is that Gundlach found it under stones in a field near a sugar mill at Magua, Cuba; Rehn secured it from under dead cocoanut palm litter along the Ferry River, Jamaica; Sein states it is encountered in houses in Porto Rico, in company with *Leucophaea maderæ*, while Wolcott reports it as taken in a banana ripening room in a fruit store in the same island.

***Blaberus craniifer* Burmeister**

Bl[abera] craniifera BURMEISTER, 1838, 'Handb. der Entom.,' II, Abth. 2, pt. 1, p. 518. Cuba.

This species is part (♀) of *Blabera varians* of Serville, as Hebard has shown.² It has generally been recorded as *atropos* of Stoll, which, however, is a South American species closely related but quite distinct, as has been demonstrated.²

The species as a West Indian insect is known only from Cuba, where it is quite common and generally distributed, being particularly abundant in houses in the cities of Santiago and Havana. Gundlach states that in Havana it is called "Cucaracha del Rostro Divino," or Cockroach of the Divine Face, from the pronotal pattern. Guérin, in 1857, recorded it, under the name *atropos*, as common about Havana,

¹Idem, pp. 295 to 296.

²1917, Mem. Amer. Entom. Soc., No. 2, pp. 201 to 202.

and Saussure similarly reported it from the same city. Rehn listed the species, as *atropos*, from Santiago de Cuba, Oriente, and Mariel, Pinar del Rio, while Hebard has reported it from Santiago de las Vegas, Havana Province. The older records from Cuba without exact localities were as follows: Brunner as *fusca* (Cuban record only); Bolivar, Gundlach and Saussure and Zehntner as *atropos*, and Rehn as *fuscus*, the latter solely a literature quotation.

Outside of the island of Cuba the species is known from Key West, Florida (probably introduced from Cuba), and a continental area extending from southern Mexico and Yucatan to British Honduras.

The characters and general variation of the species have been discussed and the insect figured by Hebard.¹ Occasionally specimens of the extremely recessive type of coloration show a far greater amount of buff on the tegmina than is true of the more usual conditions, and these specimens bear a somewhat different colorational appearance. However, such individuals are scarce, and the only one we have seen is from Meridá, Yucatan, while the other differential features given in the key will readily distinguish such pale specimens from those of *discoidalis*. The pale "face" markings of the pronotal disk are indicated in every specimen seen except one male from Tekanto, Yucatan, which otherwise is fully typical of the species.

BYRSOTRIA Stål

This genus is restricted in distribution to the island of Cuba, and is composed of two species, one of which is described as new in the present study. The species are ground-dwelling, hiding under stones and other shelter. Unlike in *Blaberus*, there is considerable difference between the sexes, the female always having abbreviate and subquadrate tegmina, non-functional wings, and a relatively large pronotum, which has its greatest breadth caudad, while the male sex possesses functional but frequently relatively short alar organs.

The two species may be distinguished by the following features.

MALE: general colors above, deep maroon and black, buffy on broad lateral and cephalic sections of pronotum; head relatively narrower, more trigonal; pronotum subpentagonal in outline, distinctly smaller, with dark suffusion covering greater portion of disk and caudal section; tegmina distinctly more coriaceous and less blaberrine in character. **FEMALE:** general form more ovoid, with greatest width at middle of abdomen, which is appreciably broadened; head broader; pronotum with dark suffusion much as in male; tegmina coriaceous, opaque,

¹Idem, pp. 199 to 205, Pl. VIII, figs. 6 and 7.

with venation much less evident and hardly elevated, humeral trunk not contrastingly colored. *fumigata* (Guérin).

MALE: general colors above, ochraceous and black; head relatively broader and less trigonal; pronotum more transverse elliptical in outline, proportionately larger, with a typical blaberine central black lyrate marking; tegmina more membranous and less coriaceous, blaberine in character. FEMALE: general form elliptical in outline, with greatest width near base of abdomen, which is not particularly broadened; head narrow and more cordiform; pronotum with maculation blaberine in character; tegmina less opaque and coriaceous, with more evident venation, humeral trunk strongly and contrastingly blackish.

cabreræ, new species.

***Byrsotria fumigata* (Guérin)**

Plate XXIV, Figure 3

Blatta (Blabera) fumigata GUÉRIN, 1857, in La Sagra, 'Hist. Phys. Polit. et Nat. de l'Île de Cuba, Anim. Artic.,' p. 335, tab. 12, figs. 4 and 4a. ♂; Environs of Havana, Cuba.

Blatta (Monachoda) thunbergii GUÉRIN, 1857, idem., p. 337, tab. 12, figs. 6 and 6a. ♂, ♀; Cuba.

[*Byrsotria thunbergii*] var. *minor* SAUSSURE AND ZEHNTNER, 1894, 'Biol. Cent.-Amer., Orth.' I, p. 120. ♀; (by inference) Cuba.

CUBA.—Santiago de las Vegas, Havana Province, IV, 1905, (George Dimmock), 1 ♀, [U. S. N. M.]. Baracoa, Oriente Province, II, 5 (immat.), XI, 1915, 1 ♀, 2 immature individuals, [Davis Cln.]. La Patana, Baracoa, Oriente Province, 1 ♂, 1 ♀, 1 immature individual, [Davis Cln.]. Cueva de las Cucarachas, La Pantana, Baracoa, Oriente Province, 1 ♂, 2 ♀, 18 immature individuals, [Davis Cln.]. San Lucas, Baracoa, Oriente Province, 1 ♀, [Davis Cln.].

It has been our privilege to examine the original types of Guérin's species, now contained in the Scudder Collection at the Museum of Comparative Zoölogy. These specimens have been very badly damaged in the past by insect pests, parts of all of them being missing. However, the identity of the names may be clearly established, and the correctness of Rehn's association of *fumigata* and *thunbergii* as variants of a single species¹ is fully demonstrated. The unique male type of *fumigata* has the body almost completely destroyed and is minus head, pronotum and all limbs except the sinistral median and caudal ones, the tegmina and wings, however, being intact. It is labelled, "*Blabera fumigata* Guer. (type) ♂. Cuba." The male type of *thunbergii* is more nearly perfect than the other types, and while badly riddled by pests it lacks only the head, supra-anal plate, dextral cephalic and sinistral median and caudal

¹1903, Trans. Amer. Entom. Soc., XXIX, p. 289; 1909, Second Rep. Centr. Experim. Station Rep. Cuba, pp. 190-191.

limbs. The label reads, "Monachoda thunbergii Guer. Voy. da Sagra, (type) Cuba." The female specimen of *thunbergii* is now merely several fragments, i. e., several thoracic tergites with the dextral tegmen and the pronotal shell. The label is, "Monachoda thunbergii Guer. ♀. Cuba."

The species *thunbergii*, from the type and other evidence, was clearly based on the relatively uncommon fully macropterous condition of the male sex. We have given below measurements of the Guérin specimens as full as their condition warrants.

We have little to add to the comments already made by Rehn, except in the way of variational and distributional information.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Cuba, type of <i>fumigata</i>		...		34 ¹	12.2 ² mm.
♂, Cuba, male type of <i>thunbergii</i>	35	10.2	14.8	23	12.8
♂, Cabaña, Havana....	34	9.5	13.4	25.5	11.9
♂, Cabaña, Havana....	34.5	9.3	13.3	21	12
♂, La Patana, Baracoa, Oriente.....	48	12.9	19	28.2	15
♀, Cabaña, Havana....	36.6	12.1	19	9.5	12.2
♀, Santiago de las Vegas, Havana Prov.	43.2	15.1	23.5	11.5	15.2
♀, San Lucas, Baracoa, Oriente.....	49	15.5	26	13.4	17
♀, Cueva de las Cuacachas, La Patana, Baracoa, Oriente....	42	13	21	11.8	13.4
♀, Cueva de las Cuacachas, La Patana, Baracoa, Oriente....	42.5	13.5	21	12	13.8
♀, Baracoa, Oriente....	54.5	14.2	24	13.8	16.9
♀, La Salud, Havana Prov.....	55.5	16.7	26.2	14	18.2

¹From basal articulation, pronotum being missing, to estimated apex, as immediate apex is damaged.

²Actual width slightly greater as tegmen is somewhat curled.

The female sex shows a great amount of variation in general size, as the measurements we have presented below will attest. It was on the minimum sized type of the female that Saussure and Zehntner placed the varietal name of *minor*, which, however, is entirely unnecessary, as it is not sharply cut off in any way from the average or maximum sized individuals. The variation in tegminal length in males is very great, and this was the reason for the original separation of *fumigata* and *thunbergii*. We have now before us no perfect male individual having the tegmina as elongate as in the type of *fumigata*, but in 1903 Rehn¹ examined a male from Guanajay, Pinar del Rio Province, which agreed fully with the figure of the type in this respect. The other males here studied all have the tegmina failing to reach the abdominal apex by about two-thirds of the pronotal length.

It is evident from the above measurements of the female sex that individual size variation is not correlated with any particular section of the island, although environmental conditions may be to some extent controlling factors.

In coloration there is little noteworthy variation, except that the ochraceous section of the pronotum varies in width, the dark section being almost restricted to the pronotal disk in some females, and in others the ochraceous is narrowed to a marginal belt, which very greatly resembles the type of marking seen in *Hemiblabera tenebricosa*. The large series of immature specimens from Cueva de las Cucarachas represents both sexes and at least four instars.

The species is apparently distributed over the entire island of Cuba, as records are available from localities extending from Guanajay in Pinar del Rio to Baracoa, Oriente, which is very close to the eastern end of the island. The previous records were from Guanajay, Pinar del Rio (Rehn); Havana (Guérin), Cabana, Havana and La Salud, Havana Province (Rehn); Cardenas, Matanzas Province (Gundlach); Cabo Cruz (Gundlach), Gibara (Gundlach) and Guantanamo (Bolivar) in Oriente Province.

The only information we have on the habits of the species are those quoted by Rehn² from the observations of the junior author, made at Cabana, Havana, in January 1904; "I found the specimens under flat stones, sometimes in colonies of three or four mature specimens and numbers of immature individuals in all stages of development. The males were very scarce and moved more quickly than the others. When

¹*Vide supra.*

²1909, Second Rep. Centr. Experim. Station Rep. Cuba, p. 191.

the sheltering stone was turned over, the colony would squat closely to the earth, but when one was seized the rest would make violent efforts to gain safety in the surrounding grass. With heads buried in the grass these insects seemed to feel perfectly safe, no matter how much of their backs remained exposed."

It is evident, from the data given above, that the species is also a cave inhabitant. Probably any sufficiently commodious nook or crevice is utilized for the temporary protection of the individual, while the larger cavities may serve a more permanent and important use in the survival of the species.

Gundlach stated that the species has a very disagreeable odor.

***Byrsotria cabreræ*, new species**

Plate XXIV, Figures 1 and 2

The present species is one which shows at first glance its distinctness from *B. fumigata*, the more truly blaberrine general coloration and the transversely scalariform light and dark dorsal abdominal pattern in both sexes being very evident features of difference. The main differential features have been given above.

TYPE.—Male; Gibara, Oriente Province, Cuba. (José Cabrera; sea coast woods.) [Academy of Natural Sciences of Philadelphia, Type No. 5386.]

Size moderately large; form depressed, elliptical in outline.

Head completely hidden under pronotum, in outline with greatest width across eyes but slightly less than greatest depth, cordiform; occipital interspace between eyes subequal to supra-ocular depth of eye and faintly less than inter-ocular space; face subdeplanate.

Pronotum transverse elliptical, point of greatest width mesad, greatest length contained one and one-half times in greatest width: cephalo-lateral margins subangulately arcuate; caudal margin regularly and broadly arcuate; surface with lyrate figure weakly elevated, relatively smooth and sparsely punctulate, pale cephalic and lateral sections of pronotum finely rugulose and sparsely shagreenous.

Tegmina translucent, with venation pronounced and elevated; apex reaching distal margin of seventh abdominal tergite, broad, rectangulato-ovate, greatest width at distal third and contained nearly twice in greatest length of same: costal margin arcuate, slightly flattened, distad rather decidedly oblique arcuato-truncate to the broad, truncato-arcuate apex; sutural margin distad sharply arcuate to the apical margin: marginal and scapular fields broad; anal field occupying slightly more than one-half of tegminal length: venation regular, anal vein regularly arcuate, axillary veins at least seven in number. Wings when in repose reaching nearly to tegminal apices, apex broad, truncato-arcuate; venation normal, evident, ulnar vein with four rami.

Supra-anal plate transverse subrectangulate, distal margin biarcuate, rounding laterad to the proximal sections of the lateral margins, which are subparallel. Cerci

subequal to the supra-anal plate in length, depressed, spatulato-styliform, apex rather blunted. Subgenital plate slightly asymmetrical, very similar to that of *B. fumigata*.

ALLOTYPE.—Female: Gibara, Oriente Province, Cuba. December, 1922. (José Cabrera; sea coast woods.) [Academy of Natural Sciences of Philadelphia.]

Differing from the description of the male in the following features.

Head faintly narrower than in male; occipital interspace between eyes slightly greater than supra-ocellar depth of eye.

Pronotum of the type usual in the genus, greatest length contained about one and two-thirds times in greatest width, which is caudad: cephalo-lateral margins regularly arcuate; caudal margin subtruncate, laterad very faintly produced toward the rectangular caudo-lateral angles; surface as in male but general contour more cucullate.

Tegmina of the abbreviate and subquadrate form usual in this sex of the genus, with apex reaching to third abdominal tergite, leaving most proximal two exposed mesad, greatest width very slightly more than greatest length: costal margin moderately arcuate; sutural margin arcuate; distal margin oblique, bisinuate, apex costad and narrowly rounded: anal vein complete, arcuate, reaching sutural margin very shortly proximad of disto-sutural angle. Wings mere rudiments.

Supra-anal plate much as in male but biarcuations not as complete, more flattened, and proximal sections of the lateral margins more diverging and less parallel. Cerci distinctly shorter than supra-anal plate, robust, much blunted.

General color ochraceous-buff, overlaid with a pattern of pitch brown (chiefly on abdomen of male and ventral surface of same in female) to pitch black. Head pitch black except ventral half of clypeus, which is zinc orange; eyes snuff brown to bistre; antennæ pitch black proximad, passing to russet (female) or ochraceous-tawny (male). Pronotum with lyrate pattern pitch black, larger spiculations touched with pitch brown; transverse bar (♀) or cloud (♂) near and parallel to the caudal margin, pitch black; cingulate margin of cephalic and lateral sections dark russet, becoming pitch black caudad of the central pattern. Tegmina with major and supplementary venation pencilled in pitch brown, except in marginal and scapular fields where the veins are largely of the basic buff; humeral trunk solidly pitch black proximad; costal margin edged with dark russet. Abdomen with tergites of the dark base color, broadly margined laterad and distad with pale color, the contrast and the tones more decided in the abbreviate tegmined female than in the male. Supra-anal plate of female of similar pattern to the other tergites, of male pale with two narrow dark transverse lines. Cerci dark. Venter of abdomen chestnut mesad, darker laterad and distad. Limbs dull burnt sienna, overlaid along flexor and extensor surfaces of femora with pitch brown; tibiæ and tarsi largely pitch brown.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Gibara, Cuba, type.	35.5	10	15.5	24	13.2mm.
♀, Gibara, Cuba, allo- type.....	43.5	13	21	14.2	14.3

In addition to the type and allotype we have before us two immature individuals, male and female, from the type locality, both taken January 3, 1923, in sea coast woods, by José Cabrera. These specimens represent different instars, the male in that immediately preceding maturity, the female probably in the third preceding maturity. In both specimens, when compared with equivalent material of *B. fumigata*, the proportionately greater size of the pronotum is evident, while the width of the head shows the differences described in the adults.

What the extent of the range of this species will prove to be remains to be determined. It is quite possible it is limited to eastern Cuba, but at present no warranted assumption may be ventured.

It gives the authors pleasure to dedicate this most interesting and distinctive species to its collector, Senor José Cabrera, of Cotorro, Havana Province, Cuba, one of the most diligent and observant students of Cuban zoology.

HEMIBLABERA Saussure

Originally described on the basis of four species,¹ i. e., *brunneri*, *manca*, *capucina* and *granulata* Saussure, Kirby indicated² *manca* (now equalling the older *brunneri*) as the genotype of the assemblage. The genus clearly occupies a position intermediate between *Byrsotria* and *Aspiduchus*, here described. The species *brunneri* has a distinct tendency toward *Byrsotria*, while conversely *H. pabulator* and *granulata* exhibit more of an approach toward *Aspiduchus*. The four West Indian species before us should, in our opinion, be arranged linearly as placed in the following treatment.

KEY TO WEST INDIAN SPECIES OF *Hemiblabera*

1. General base color fuscous to blackish fuscous; pronotum of general color or with a sharply defined or subobsolete continuous paler cephalic and lateral margin, and occasionally a chestnut disk spot. Tegmina solidly dark. Abdomen transversely barred, chestnut to garnet brown or maroon on blackish or solidly fuscous blackish.....2.
- General base color ochraceous-buff; disk only of pronotum fuscous. Tegmina with vicinity of humeral trunk blackish fuscous, discoidal field clouded with same, marginal field contrastingly pale. Abdomen buffy and fuscous, transversely barred or median section of dark bars lacking. (Size medium.) [Bahamas.] *pabulator*, new species.
2. Size medium. Pronotum less transverse, greatest length contained one and one-half times in greatest width of same; caudo-lateral angles hardly pro-

¹1893, Soc. Entom., VIII, p. 68.

²1904, 'Synom. Catal. Orth.', I, p. 166.

duced caudad. Tegmina of female with distal margin distinctly oblique; sutural margin of same one-half to three-fifths as long as costal margin. . . . 3.

Size large. Pronotum more transverse, greatest length contained one and two-thirds times in greatest width of same; caudo-lateral angles appreciably produced caudad. Tegmina of female with distal margin less oblique, this transversely arcuato-truncate in male; sutural margin of same subequal to or four-fifths as long as costal margin. Pale pronotal margin narrow, not at all or very obscurely reaching to caudo-lateral angles. [Hispaniola.]

tenebricosa, new species.

3. Coloration dull, nearly uniform; chiefly fuscous; paler lateral marginal section of pronotum obscure: surface, particularly of pronotum and tegmina, shagreenous. Tegmina in both sexes distinctly trigonal, not attingent; sutural margin not more than one-half as long as costal margin. [Antigua.]

granulata Saussure.

Coloration ranging from brilliant and contrasted with abdominal barring relatively conspicuous, to a general blackish fuscous, with abdominal barring virtually obsolete; yellow lateral and cephalic border of pronotum decided: surface faintly (♂) or weakly (♀) subshagreenous, moderately (♂) or weakly (♀) polished. Tegmina in male subquadrate, attingent; sutural margin at least three-fifths as long as costal margin: in female trigonal, hardly attingent; sutural margin not more than half as long as costal margin; distal margin oblique subsigmoid. [Porto Rico.] *brunneri* (Saussure).

Hemiblabera brunneri (Saussure)

Blabera brunneri SAUSSURE, 1869, Rev. et Mag. de Zool., (2) XXI, p. 113. ♀; Brazil.

Blabera brunneri SAUSSURE, 1870, Miss. Scientif. Mexiq., Rech. Zool., VI, p. 117. ♀; Antilles?

H[emiblabera] manca SAUSSURE, 1893, Soc. Entom., VIII, p. 68. ♂; Porto Rico.

Hemiblabera brunneri SAUSSURE AND ZEHNTNER, 1894, 'Biol. Cent.-Amer., Orth.', I, p. 122. Porto Rico.

Hemiblabera manca SAUSSURE AND ZEHNTNER, 1894, idem, p. 122, Pl. v, fig. 20. ♂; Porto Rico.

PORTO RICO.—Fajardo, Dept. of Humacao, II, 1899, (A. Busck), 2 ♂, [A. N. S. P. and Hebard Cln.]. Boqueron, Dept. of Humacao, V, 22, 1923, (from Porto Rico Dept. of Agr.; under bark of a tamarind tree), 1 ♀, [A. N. S. P.].

CULEBRA ISLAND.—II, 1899, (A. Busck), 1 ♀, [U. S. N. M.].

A careful study of the descriptions and an examination of the material before us demonstrates that *brunneri* and *manca* were based on opposite sexes of the same species. For some reason Saussure failed to realize this when he described *manca*, although Brunner years before¹ had fully described both sexes, but unfortunately did not name the species. Rehn²

¹1865, 'Nouv. Syst. Blatt.', p. 383.

²1910, Bull. Amer. Mus. Nat. Hist., XXVIII, p. 76.

also recognized the sexes as belonging to the same species, although he used *manca* for the insect. This was due to the influence of an earlier erroneous determination of *brunneri*, the material so referred representing *H. pabulator*, described below.

Brunner first recorded this species on the basis of a pair from Porto Rico,¹ but failed to give it a name. The name *brunneri* was based on material erroneously reported from Brazil, which record one year later (1870), in the 'Mission Scientifique,' Saussure queried as Antillean. The following year (1872) Saussure² definitely recorded the species as from "Les Antilles; St.-Vincent; Porto Rico."

All subsequent information was based on specimens from Porto Rico, Culebra and St. Thomas (Shelford), except for Rehn's record from Nassau, Bahamas,³ which we now know relates to a species here described as new (*pabulator*). Thus it would seem the species is limited in distribution to Porto Rico, and possibly solely the eastern part of the island, the adjacent members of the Virgin Islands and probably through the Lesser Antilles as far as St. Vincent, although the fact that no recent work on St. Vincent or nearby islands has brought the species to light, would seem to raise some doubt as to the correctness of the record from that island.

It is evident that considerable variation may exist in the general coloration and in the presence of a pronotal and a dorsal abdominal pattern. The Boqueron female is nearly uniform blackish fuscous above and below, with but subobsolete indications of proximal rufescent bars on the abdominal segments and no trace of a median pronotal pattern, although the yellow bordering marking of the lateral and cephalic periphery of the pronotum is as strongly indicated as in the more usual rufescent phase. In the blackish female, however the yellow pronotal marking does not extend mesad along the caudal margin, even to the slight extent it does in the rufescent condition. The head and limbs in the dark female are solidly of the same color as the remainder of the body, except that the coxæ and femora show intimations of a dull rufescent wash. The frequent absence of the reddish median maculation on the pronotum, described by most authors as one of the specific features, has already been noted by Rehn,¹ who found it absent in two of three Culebra specimens.

¹1865, 'Nouv. Syst. Blatt.,' p. 383.

²'Mél. Orth.,' II, fasc. 4, p. 145.

³1903, Trans. Amer. Entom. Soc., XXIX, p. 290.

The difference in the tegminal shape in the two sexes has been described by both Brunner and Rehn.¹

The four specimens before us measure as follows.

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Greatest Length of Tegmen	Greatest Width of Tegmen
♂, Fajardo, Porto Rico, [A. N. S. P.].....	24.2	8	12.1	7.1	7.2mm.
♂, Fajardo, Porto Rico, [Heb. Cln.].....	26.7	8.4	13.2	7.8	8
♀, Boqueron, Porto Rico, [A. N. S. P.]....	33.2	10.5	16	8	8.7
♀, Culebra Island, [U. S. N. M.].....	35.5	11.8	18.3	9.5	10.5

***Hemiblabera tenebricosa*,² new species**

Plate XIX, Figures 9 to 11

A close relative of the Porto Rican *H. brunneri*, from which it differs chiefly in the larger size, more transverse pronotum, which has its caudo-lateral angles more produced caudad, in the less oblique distal margin of the tegmina, and in consequence the nearly rectangulate disto-costal angle of the same, in the more limited and narrower yellow border of the pronotum, and in the lateral portions of the pronotum being more closely shagreenous.

TYPE.—Male; Fortaleza San Luis, Santiago [de los Caballeros], Province of Santiago, Dominican Republic, Hispaniola. April 7, 1919. (H. B. Sherman.) [Academy of Natural Sciences of Philadelphia, Type No. 5386.]

Size moderately large; form ovoid, moderately depressed; surface of dorsum weakly shagreenous, due to a covering of fine tooth-like points of variable density.

Head completely hidden under pronotum, cordiform in outline; interspace between eyes distinctly less than that between ocellar spots, equal to one and one-half times the greatest depth of eye, occipital border of eye arcuate; antennæ with third joint two-thirds as long as first joint.

Pronotum large, transverse, semicircular, greatest length contained one and two-thirds times in greatest width of same: lateral margins regularly arcuate, joining cephalad by a narrowly rounded section; caudo-lateral angles rectangulate, appreciably but not markedly produced or "hooked" caudad; caudal margin truncate mesad, weakly concave laterad, which somewhat accentuates the production of the lateral angles; all margins cingulate, the peripheral ones more strongly so and appre-

¹Vide *supra*.

²I. e., shrouded in darkness.

ciably but weakly reflexed, margins in vicinity of lateral angles finely striatulate. In transverse section pronotum is distinctly bullate on disk, regularly concavo-declivent laterad, in longitudinal section with almost no indication of this cephalad. Surface of pronotum with a rather obscure lyriiform pattern on disk, made up of a faintly elevated smoother area, with a pair of impressed, diverging arms, a median subcircular impression; remainder of surface appreciably finely shagreenous, particularly laterad, the spicules showing some faint tendency to form radiating lines caudo-laterad.

Tegmina quadrate, length and breadth subequal, reaching to third abdominal segment, attingent and narrowly overlapping: costal margin gently arcuate, disto-costal angle rounded rectangulate; sutural margin approximately as long as costal margin, moderately arcuate; distal margin nearly transverse, truncato-arcuate; disto-sutural angle rounded rectangulate; costal margin appreciably cingulate: humeral trunk well indicated, also other principal veins, and a radiating marginal field venation, no definite anal vein: marginal field in width equal to slightly more than two-fifths of entire tegmen: surface sparsely shagreenous. Wings rudimentary, hidden under tegmina.

Abdomen with dorsal surface sparsely shagreenous, ventral surface smooth. Tergites with caudo-lateral angles moderately acute produced. Supra-anal plate transverse subrectangulate, brief lateral margins rounding into the arcuato-truncate distal margin, which has a small but distinct rectangulate median excision. Cerci reaching to distal margin of supra-anal plate, broad depressed, acute styliform. Subgenital plate asymmetrical, regularly arcuate sinistrad and distad, broadly arcuato-emarginate dextrad; styles slender, dextral style at base of dextral emargination.

Limbs not particularly robust for body bulk. Caudal tarsi with metatarsus slightly shorter than length of other joints combined; pulvilli marked; arolia absent.

ALLOTYPE.—Female; Puerto Plata, Province of Puerto Plata, Dominican Republic, Hispaniola, July 5, 1915. (Norman L. Orme, Jr.) [American Museum of Natural History.]

Differs from the description of the type in the following features:

Size large. Head broader than in male. Interspace between eyes broad, slightly less than that between ocellar spots.

Pronotum in transverse section more decidedly bullate, lateral sections decidedly declivent.

Tegmina abbreviate, rectangulate, slightly transverse, greatest length slightly more than five-sixths of pronotal length, reaching to second abdominal segment, sutural margins overlapping briefly mesad: costal margin less arcuate, nearly straight; disto-costal angle broadly rounded rectangulate: sutural margin subequal to costal in length; distal margin weakly oblique, truncate; disto-sutural angle narrowly rounded rectangulate: marginal field equal in width to two-fifths of entire tegmen.

Supra-anal plate more strongly transverse than in male, distal margin more distinctly arcuate. Cerci shorter than supra-anal plate, ovate-lanceolate, very blunt. Subgenital plate ample, with appreciable subcercal emarginations, margin arcuate mesad.

General color pitch brown to pitch black, showing the rich translucence of pitch brown most evident in type. Pronotum with pale border of lateral cephalic sections relatively narrow, but varying in actual width, ochraceous-buff to ferruginous, widest immediately dorsad of each side of head, thence caudad narrowing and becoming

obsolete well cephalad of or near the caudo-lateral angles or continuing of equal width to that angle, but subobsolete caudad of the middle of lateral margins. Abdomen solidly colored or with segments transversely barred proximad with burnt sienna to garnet brown or maroon. Head with median portion of face chestnut to bay, distinctly or little contrasted with dark remainder of head. Eyes hair brown. Antennæ of general color proximad, passing to auburn distad. Venter of abdomen colored much as dorsum, but paler. Limbs buckthorn brown to dresden brown proximad, passing to hay's russet to liver brown on tibiæ and tarsi.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Santiago de los Caballeros, Prov. Puerto Plata, Dominican Republic, type.....	32.5	11.2	19.5	10.8	11.3mm.
♀, Puerto Plata, Dominican Republic, allotype.....	40	13.3	22	10.3	13.4
♀, Puerto Plata, Dominican Republic, paratype.....	46.5	14.5	25.2	12	14.5
♀, Nassau, New Providence Island, Bahamas.....	41.2	13.7	22.2	12.2	14.1

In addition to the type and allotype we have before us two adult females, one a paratype, from the same locality as the allotype, but taken May 8, 1915 by F. E. Watson, from the American Museum of Natural History; another from Nassau, New Providence Island, Bahamas, from the Brooklyn Institute; also an immature female in the instar preceding maturity, taken with the allotype. The additional adult specimens are both somewhat larger than the allotype, as the above measurements show. In addition the tegmina are slightly more obliquely, and in the case of the paratype more sigmoidly, arcuate distad than in the allotype. The pale pronotal border is less sharply defined in the paratype, becoming obsolete near the caudo-lateral angles, but throughout rather broader and duller than in the allotype. The Nassau specimen has the pale border much as in the type, but broader above sides of head. The latter specimen also has the abdomen almost uniform pitch black.

We felt considerable misgiving as to the correctness of the locality of the Nassau specimen. We referred the matter to Mr. Charles Schæffer,

of the Brooklyn Institute, for advice, and he informs us there can be no question as to the correctness of the locality, the material having been taken by Mr. Engelhart while collecting material in the Bahamas, that no visit was then made to Hispaniola, and the material was carefully handled and labelled subsequently. It would seem, in consequence, that the species was accidentally introduced at Nassau from the Dominican Republic. The possibility of such introduction is far more likely than would at first be imagined, when it is realized that the principal steamship line from New York visiting Dominican ports calls each way at Nassau. The facts set forth by Mr. Schæffer have corroborative evidence in that *H. pabulator*, here described, known only from the Bahamas, was contained in the same accession lot as the specimen of *tenebricosa*.

The immature female is about three-fourths the bulk of the allotype, has the pronotal form quite distinctive when compared with the condition of *Blaberus*, and has its dorsal surface, particularly of the thoracic segments and the proximal abdominal segments, finely and closely shagreenous. The pale pronotal margin is distinctly but not completely indicated in this specimen.

***Hemiblabera pabulator*,¹ new species**

Plate XIX, Figures 12 and 13

Hemiblabera brunneri REHN, 1903, Trans. Amer. Entom. Soc., XXIX, p. 290. Nassau, New Providence, Bahamas. (Not *Blatta brunneri* of Saussure, 1869.)

Hemiblabera species MORSE, 1905, Psyche, XII, p. 19. Mangrove Cay, Andros, Bahamas.

Very distinct from the other West Indian species of the genus, and one is referred to the generic comments above for its position in relation to the associated species, as well as its chief differential features. In coloration the present insect is very distinct from the others of the genus, being paler and lacking all rufescent tendencies, while the pronotal disk alone is dark, the tegmina also being basically pale. The tegmina approach those of *brunneri* more nearly in form than they do those of *tenebricosa*, but the pronotal form is more nearly that seen in *tenebricosa* than in *brunneri*.

TYPE.—Male; Mangrove Cay, Andros Island, Bahamas. 1904. (Owen Bryant.) [Hebard Collection, Type No. 843.]

Size medium (for subfamily): form elliptical, rather strongly depressed: surface moderately polished, but with that of pronotum sparsely and minutely shagreenous, of tegmina cribroso-punctulate, minutely shagreenous in the neighborhood of the humeral trunk; abdomen and venter smooth with occasional minute points.

¹I. e., a forager.

Head completely hidden under pronotum, cordiform in shape; interspace between eyes slightly less than that between ocellar spots, equal to one and one-half times the greatest depth of eye, occipital border of eye subtruncate; antennæ with third joint slightly less than half as long as proximal joint.

Pronotum relatively large, transverse, semicircular, greatest length contained one and three-fifths times in greatest (caudal) width of same; of form usual in genus, cephalic rounding of margins broader than in *H. tenebricosa*; caudo-lateral angles rectangulate; caudal margin truncate; all margins cingulate, the arcuate ones more distinctly so, margins in vicinity of caudo-lateral angles obscurely oblique striatulate. In section pronotum is deplanate arcuate, laterad faintly concave declivent, no indication of this cephalad. Surface of pronotum with lyrate area of disk, consisting of two closely placed reversed boot-shaped sections, weakly elevated or otherwise differentiated from general surface.

Tegmina subquadrate, greatest length and proximal width subequal, the former also subequal to the greatest length of the pronotum; apices reaching to base of third abdominal segment, sutural margins narrowly overlapping: costal margin weakly arcuate, more sharply curving to apex, which is disto-costal and well rounded; sutural margin two-thirds as long as costal margin, moderately arcuate, passing by an obtuse angle into the somewhat oblique, truncate distal margin: marginal field of tegmina broad, at its base equal to nearly two-fifths of total width of tegmen: humeral trunk well marked; discoidal field with about three principal oblique veins diverging from humeral trunk, no clearly indicated anal vein. Wings greatly reduced, hidden under tegmina.

Abdomen with tergites having caudo-lateral angles moderately acute produced. Supra-anal plate transverse, rounded rectangulate, supra-cercal section of margin regularly passing into the general arcuation of the distal section, a median obtuse-angulate emargination present; surface of plate with a shallow proximal transverse depression and a pair of larger depressions near the distal margin, a fine median carinula evident distad. Cerci reaching to distal margin of supra-anal plate, tapering, conical, apex acute. Subgenital plate moderately asymmetrical, sinistral and distal margins regularly arcuate, passing by a rounded rectangulation to the sharply rectangulate emarginate dextral side: styles very small, the sinistral placed near the sinistral base, the dextral at the base of the dextral excision: surface of plate from base of dextral style intermarginally about dextral excision of margin, canaliculate excavate.

Caudal tarsi with metatarsus very faintly shorter than length of other joints combined; pulvilli present; arolia absent.

ALLOTYPE.—Female; Nassau, New Providence Island, Bahamas. (S. H. Hamilton.) [Academy of Natural Sciences of Philadelphia.]

The features given below are those of difference from the description of the male sex above.

Size slightly greater than in male sex; surface with shagreenous character of pronotum and tegmina somewhat more marked.

Head with interspace between eyes equal to twice occipital depth of eye.

Tegmina as in male, but sutural margin faintly shorter and distal margin more strongly oblique, venation heavier and more numerous than in male, marginal field with intimations of irregular veins diverging from humeral trunk.

Supra-anal plate as in male in shape, but surface without transverse proximal depression. Cerci somewhat shorter than supra-anal plate, subdepressed, blunted. Subgenital plate of usual type.

General pale color light ochraceous-buff to ochraceous-buff, passing to buckthorn brown on the dorsum of the abdomen. Head with labrum and ventral portion of clypeus sharply mustard yellow to tawny; remainder of head russet to liver brown, with a vertical infra-ocular section, an interantennal bar and the dorsal section of the clypeus brownish black. Occasionally the head, except pale buccal region, is solidly brownish black (σ^7 paratype), again the ventral section of face is much deeper in color than the area dorsad of the dark transverse bar (immature ♀). Antennae tawny paling to mustard yellow, or mars brown paling to tawny. Eyes russet to fuscous. Pronotum with disk fuscous, the shagreenous points of the surface surrounding the disk touched with the same; disk maculation limited to the paired structural area described above (type) or covering a semi-elliptical area of much greater size (paratypic male and allotype), the density of the maculation somewhat variable and occasionally showing faint ferruginous points, as well as a nearly complete pale median dividing line; entire margin of pronotum as well as costal margin of tegmina vinaceous-rufous. Tegmina with humeral trunk suffused with fuscous, the discoidal field with a wash of tawny to cinnamon-brown, paling toward the sutural and distal margins; marginal field rather sharply pale. Abdomen with the dark transverse bars proximad on the segments relatively solid (allotype) or broken into lateral groups (type and paratype), not involving lateral marginal region of segments; in the condition with reduced bars the lateral groups by reduction in density segregate into a large circular spot, two small dots and a short line. Supra-anal plate and cerci largely fuscous, in the type the former is basically the same color as the dorsum of the abdomen with radiating dark cloud lines. Venter with its base color correlated with that of dorsum; coxæ prout's brown (intensive) to weak cinnamon-brown (recessive), in the former case including the femora and passing to hazel or ochraceous-tawny distad on the femora and including the tibiae and tarsi, or in the latter case with the limbs aside from coxæ mars yellow.

The type is in the recessive condition, the paratypic male and allotype are distinctly intensive in coloration.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
σ^7 , Mangrove Cay, Andros Island, type . .	32.5	10	16.2	10	9.8mm.
σ^7 , Nassau, New Prov- idence Island, para- type	25.7	9.2	15	8.6	9
♀ , Nassau, New Prov- idence Island, allotype	37.5	11	17.5	10.2	11

In addition to the type and allotype we have before us an adult male from Nassau, New Providence Island, Bahamas, the property of the Brooklyn Institute of Art and Sciences, which we consider a paratype, and an immature female in the Hebard Collection, bearing the same data as the type. The two males examined demonstrate that the species has an appreciable amount of variation in size in the same sex, although the extension (type) or retraction (paratype) of the abdomen has much to do with the apparent difference in the general length. Examination of the ventro-cephalic margin of the femora shows that on the cephalic femora this margin may be unarmed, or may have from one to three spines mesad while the median and caudal femora may be unarmed or have from one to two or three well-spaced spines. The immature specimen is probably in the second instar preceding maturity, has the surface shagreenous character quite decided and its coloration does not differ markedly from that of adults.

Hemiblabera granulata Saussure

H[emiblabera] granulata SAUSSURE, 1893, Societas Entomologica, VIII, p. 68. ♀; "Mexico."

Hemiblabera granulata SAUSSURE AND ZEHTNER, 1894, 'Biol. Cent.-Amer., Orth.', I, p. 122, Pl. V, fig. 21. ♀; "La Antigua in Vera Cruz, Mexico."

Caudell has recently reported this species from the island of Antigua, Lesser Antilles,¹ and through his kindness we have before us a pair of the species. We fully support his identification, and we would emphasize strongly the probability of the locality originally given for this species being erroneous in interpretation. We think it probable that the type was labelled "Antigua," that Saussure for some reason believed this was a locality in Mexico, and, in 1894, in endeavoring to find an "Antigua" in Mexico, could locate only "La Antigua, Vera Cruz." Whether this assumption is correct probably can never be determined, but the fact remains that the species, virtually beyond question, occurs only on the island of Antigua.

Caudell has erred in stating the male cannot be distinguished from the female by the number of sternites or ventral abdominal segments. The male before us shows seven evident ventral abdominal segments in addition to the subgenital plate. The distal of these segments is apparent in the male before us only laterad, but it is present, as well as six other clearly visible segments.

¹1922, Univ. of Iowa Studies Nat. Hist., X, No. 1, pp. 26-29, fig. 2.

The species is more shagreenous and dully colored than any other of the genus, and represents a somewhat different stock from *pabulator*, but likewise shows marked tendencies toward *Aspiduchus*.

ASPIDUCHUS,¹ new genus

This genus is apparently related on one hand to *Hemiblabera* Saussure, and on the other to *Monachoda* Burmeister. From both it differs in the extreme deplanation of the pronotum, which also is almost exactly semi-circular in outline, and in the reduced but rounded coriaceous tegmina in both sexes, which also possess evident anal sulci, and in the non-fossorial and distinctly cursorial type of development of the cephalic tibiæ. From *Hemiblabera* the present genus is also distinguishable by the more marked deplanation of the whole body, and by the relatively great width of the marginal field of the tegmina. From *Monachoda*, *Aspiduchus* also differs in the far more distant eyes, semi-circular pronotal form, which has its caudal margin truncate, and no cucullate pronotal tendency at all indicated, in the reduced tegmina and wings, in the acute angulate caudo-lateral angles of the abdominal tergites, and in the elongate metatarsi.

GENERIC DESCRIPTION.—Form deplanate; tegmina abbreviate; wings greatly reduced. Head hidden under pronotum, broad, deplanate, subcordiform; occipital interspace between eyes not less than one and one-half times occipital depth of eye; antennæ with proximal joint large. Pronotum semi-circular in outline, markedly deplanate, disk and supra-cephalic section but weakly indicated; caudal margin transversely sub-truncate; surface largely fine shagreenous. Tegmina covering nearly one-half of abdomen, arcuate distad; marginal field very broad; venation simple, anal sulcus indicated; surface coriaceo-shagreenous. Wings reduced, hidden under tegmina. Abdomen with caudo-lateral angles of tergites produced acute; supra-anal plate of both sexes ample, sub-bilobate; subgenital plate of male asymmetrical. Limbs slender, tibiæ all elongate and cursorial in type, spines long and slender. Metatarsi elongate; pulvilli large; arolia absent.

GENOTYPE.—*Aspiduchus deplanatus* (*Blabera deplanata*) (SAUSSURE).

The reference of the typical and unique species of this genus to *Archimandrita* by Saussure² was made without any adequate study of material, as, while some affinity exists, as shown above, violence was done evident relationships, manifest in the form and texture of the pronotum and tegmina and the general shape of the body.

¹From ἀσπίδ ουχος, buckler-bearer.

²1893, Soc. Entom., VIII, p. 67.

Aspiduchus deplanatus (Saussure)

Plate XIX, Figure 14

B[labera] deplanata SAUSSURE, 1864, Rev. et Mag. de Zool., (2) XVI, p. 348. Antilles.*Blabera deplanata* SAUSSURE, 1864, Mém. Hist. Nat. Mex., I, pt. 3, p. 250. ♀; Cuba.*Archimandrita deplanata* SAUSSURE AND ZEHNTNER, 1894, 'Biol. Cent.-Amer., Orth.,' I, p. 116, Pl. v, fig. 18. ♂, ♀; Cuba.

PORTO RICO.—Corozal, Dept. of San Juan, I, 25, 1914, I, 18, 1915, (H. E. Crampton; in limestone cavern, by thousands in grass and walls), 6 ♂, 1 ♀, 11 immature ♂, 1 immature ♀.

While originally described from Cuba this striking and distinctive species has not been reported from that island, on the basis of new material, since the original description. Gundlach¹ first recorded it from Porto Rico, where he stated it occurred under stones and leaf litter, further commenting that he had not encountered it in Cuba. The latter remark he repeats in his Cuban "Contribucion."

Apparently the species is locally numerous in suitable situations, such as caves, rock crevices and the shelter of large stones.

The specimens before us fully agree with the descriptions and figure published by Saussure, and Saussure and Zehntner. The sexes show no differences in their general appearance, and the single adult female is not appreciably larger than the largest males. Whether the relative scarcity of females, both adult and immature, in our material represents a natural condition, or is due to collecting chance, we are unable to say. Saussure and Zehntner have mentioned in the 'Biologia' that the number of spines in the median group on the cephalic femora is variable, and this is fully supported by the material before us. The adult specimens before us show the following formulæ for these spines: 0-3, 2-0, 1-2, 2-3, 2-3, 2-4, 4-3. It is evident that presence or absence of these spines, aside from number when present, is of no specific value.

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♂, Corozal, Porto Rico.	44.8	14.2	24.2	17.5	13.2 mm.
♂, Corozal, Porto Rico.	49.4	15.4	25	19.5	15.2
♀, Corozal, Porto Rico.	52.8	15.6	25	21	16

¹1887, An. Soc. Españ. Hist. Nat., XVI, p. 144.

The form of the pronotum in the immature individuals shows clearly evident the relationship of this genus to *Hemiblabera*. The series of immature specimens represents four instars, the youngest with a body length of nineteen millimeters.

Corydiinæ

The Corydiinæ is a group of blattids of very diverse form, character, and habits, in many ways one of the most interesting assemblages in the family. In size there is a great amount of variation in the forms belonging to the subfamily, although the majority are quite small, and often symbiotic with termites, ants, bees and wasps. Of many of the species we know nothing concerning their habits. A number of the species possess marked sexual dimorphism. The body, and occasionally tegminal, surface in a number of genera is covered, to a considerable degree, with depressed chætiform hairs.

The region of greatest differentiation and probable center of distribution of the subfamily is tropical America, and particularly the Brazilian and Guianan section. But seven genera, of more than twenty, occur in the Old World, and of these two are circumtropical and four strictly African.

KEY TO WEST INDIAN GENERA OF THE CORYDIINÆ

1. Distal joint of palpus elongate, acute lanceolate, not infundibuliform or trigonal in outline. Male with short, sub-quadrated tegmina. Wings rudimentary. Female unknown. (Limbs very slender and elongate. Distinct arolia present.).....*Pholadoblatta*, new genus.
Distal joint of palpus broad, infundibuliform or trigonal in outline. Male (unknown in *Simblerastes*) with fully developed tegmina and wings. Female fully winged (*Holocompsa* and *Latindia*) or apterous (*Simblerastes*). 2.
2. Female apterous; form ovate, polyphagoid, dorsum as a whole heavily hirsute. Limbs short and very robust; tibiæ closely and heavily spined. No arolia or pulvilli present. (Male unknown.).....*Simblerastes*, new genus.
Male and female with fully developed tegmina and wings; form elliptical to elongate elliptical, dorsum as a whole not heavily hirsute, hairs covering either sparse or largely limited to pronotum. 3.
3. Form ovate, not strongly deplanate. Tegmina obliquely and sharply divided into an opaque and a hyaline section. Limbs robust, relatively short; tibiæ heavily spined. Arolia present. Coloration contrasted, often in part with metallic sheen.....*Holocompsa* Burmeister.
Form elongate elliptical, strongly deplanate. Tegmina not divided into an opaque and a hyaline section. Limbs slender, elongate; tibiæ very sparsely spined. Arolia absent. Coloration largely dull and uniform.....*Latindia* Stål.

Holocompsa Burmeister

The genus *Holocompsa* is composed of a small number of species found in the tropics of both hemispheres, but more numerous in species in Central America than any other part of the world. The species are all small, secretive in habits and one at least has been extensively distributed by commerce. Some species are strikingly colored and others have a marked metallic sheen on portions of their tegmina, this being very pronounced in *H. metallica* described below.

KEY TO WEST INDIAN SPECIES

- Form more robust. Female with pronotum yellow to orange-rufous, weakly suffused with dark brown at caudal margin. Lateral portions of pronotum not subvertical. Metallic green-blue sheen of opaque portion of tegmen weak in both sexes. Hyaline portion of tegmina of ♀ weakly brownish suffused, with broad clear transverse bar at middle of tegmina. Ventro-cephalic margin of cephalic femora distad with two spines. (Male with pronotum blackish.) [West Indies in general.].....*nitidula* (Fabricius).
- Form more slender. Female with pronotum black. Lateral portions of pronotum subvertical. Metallic blue sheen of opaque portion of tegmen brilliant. Hyaline portion of tegmina of ♀ weakly brownish suffused, with narrow sharply evident clear transverse band at distal third of tegmina. Ventro-cephalic margin of cephalic femora distad with a single spine. (Male unknown.) [Hispaniola.]
metallica, new species.

Holocompsa nitidula (Fabricius)

[*Blatta*] *nitidula* FABRICIUS, 1781, 'Spec. Ins.,' I, p. 345. ♀ (from description); Surinam.

DOMINICA.—Laudet, VI, 12, 1911, (F. E. Lutz; vicinity of house), 1 ♀.

This minute species shows considerable difference in coloration in the sexes, the chief one being that in the male the pronotum and opaque portion of the tegmina are uniform blackish, with a weak but appreciable metallic green-blue sheen, while the female has the pronotum largely orange, the blackish with metallic green-blue sheen limited to the same portion of the tegmina as in the male. Burmeister's *cyanea* was based on the male, his *collaris* on the female sex, both from St. Thomas, as Hebard has shown in his detailed treatment of the species.¹

Numerous records of the species from the "Antilles," without specification of exact locality, appear in the literature, while it has been definitely recorded from the following islands: Cuba (as *collaris* by Guérin, Brunner, Bolivar and Gundlach; as *cyanea* by Saussure, Walker,

¹1917, Mem. Amer. Entom. Soc., No. 2, pp. 206-208.

Bolivar and Gundlach); Havana, Cuba (Rehn as *cyanea*); Jamaica (as *Euthyrgrapha nitidula* by Walker); Porto Rico (as *collaris* and *cyanea* by Gundlach); St. Thomas (as *cyanea* by Burmeister, Brunner and Walker; as *collaris* by Burmeister and Brunner); Dominica (above); St. Vincent (as *collaris* by Brunner).

Outside of the West Indies the species is known from Key West, Florida, Mexico, Surinam, Mauritius, Spanish Guinea, Cameroons, French Congo and Ivory Coast, western Africa. It is a domiciliary species and is probably widely distributed within the American tropics, from which it is spreading to parts of the warmer regions of the Old World. Probably a native of the West Indies its West African distribution may be explained by slave ship introduction, while its occurrence in Mauritius may have been due to an extension from a West African colony by slave ships headed to the Mascarenes, which received many African slaves. Gundlach states that in Cuba it is found in houses under boards, chests, etc. At Key West, Florida, the authors found the insect in folds of burlap bags under the counter of a fruit store, in company with *Supella supellectilium*, *Blattella germanica*, *Leurolestes pallidus* and *Periplaneta americana*, and with *Blaberus craniifer* between old boards in a wood shed.

Holocompsa metallica, new species

Plate XX, Figures 1 and 2

This is a strikingly beautiful insect related to *H. nitidula*, but with a far more brilliant metallic blue sheen on the opaque portions of the tegmina. This condition is in the female sex, while the parallel but far less intensive condition of *H. nitidula* is in the male sex alone. The general form is more slender than the same sex of *nitidula*, the lateral sections of the pronotum are more deflexed, the tegmina and wings surpass the apex of the abdomen by nearly the pronotal length, while a striking difference is that the ventro-cephalic margin of the cephalic femora possesses but a single spine distad, instead of two as in *H. nitidula*.

TYPE.—Female; Sanchez, Province of Samaná, Dominican Republic, Hispaniola. May 27, 1915. (F. E. Watson; along railroad through jungle and swamp west of town.) [American Museum of Natural History.]

Size very small; form as usual in genus but slender for female sex; surface moderately shining, pronotum and marginal field of tegmina with numerous hairs, some longer and more erect than the others, which are declivent, far less hirsute than *H. nitidula*.

Head almost completely hidden under pronotum when seen from dorsum.

Pronotum weakly transverse, disk moderately arcuate in transverse section, lateral section strongly deflexed and subvertical, regularly passing into disk, a narrow medio-longitudinal impression and paired subcircular shallowly impressed areas laterad on disk are present: cephalic margin moderately convex, passing by a

rounded obtuse-angulation into the arcuato-truncate lateral margins; caudo-lateral angles narrowly rounded obtuse; caudal margin of disk shallowly convex: surface of lateral portions of pronotum appreciably impressed, particularly caudad, while the margin is distinctly cingulate, thus giving the impression of an intermarginal groove in this area.

Tegmina surpassing apex of abdomen by nearly length of pronotum, of the same general type found in *H. nitidula*, but line delimiting opaque proximal section more arcuate proximad. Wings reaching to tegminal apices.

Supra-anal plate weakly transverse, margin broadly and markedly convex. Subgenital plate with valvar emargination acute-angulate, valves faintly convex in profile. Cerci with six to seven joints.¹

Cephalic femora with ventro-cephalic margin bearing but a single quite large spine distad.

Color of head, pronotum and venter black, the limbs pitch brown. Tegmina with opaque portions brilliant metallic antwerp blue; transparent portions of tegmina infumate with dresden brown except for a narrow transverse perfectly clear hyaline section at tip of opaque portion. Antennæ black.

Length of body, 4.2 mm.; length of pronotum, 1.34; greatest width of pronotum, 1.93; length of tegmen, 4.36; greatest width of tegmen, 1.84.

The type of this beautiful species is unique.

SIMBLERASTES,² new genus

This genus, of which unfortunately only the female sex is available, has much the same general appearance in that sex as the polyphagid genera *Arenivaga* and *Eremoblatta*, but the sum total of its features show more relationship with the Corydiinæ than with the Polyphaginæ. Our lack of knowledge of the male sex is most regrettable, as more conclusive evidence on the position and relationship of the genus would then be available. This additional information we hope will be secured in the near future.

Probably the nearest relatives of *Simblerastes* are *Holocompsa* and *Compsodes*, the present genus being one of those possessing a valvate subgenital plate in the female sex. However, this association is of a provisional nature, as it would be unwise in the absence of the male sex to do more than indicate a tentative position for the genus. The relationship with *Latindia* and *Melestora* can be determined only when more is known concerning *Simblerastes*. It is evident that no intimate relationship exists with the myrmecophilid genera *Attaphila* Wheeler, *Phorticolea*, *Nothoblatta* and *Atticola* Bolivar, as well as *Pholadoblatta* here described. The distinctness of *Simblerastes* from *Sphecochila* Shelford is

¹One cercus complete has six joints, the other with at least the distal clearly lacking has six present.

²From *συνελας*, a bee-hive or store, and *εραστής*, a lover, in allusion to the association of the genotypic species with termites' nests.

apparently certain, although our material of the latter genus is hardly in comparable condition. *Sphecophila* has the cerci narrow and tapering, instead of broadly subspatulate styliform, the limbs are more slender, and the body lacks the markedly bristling vestiture of *Simblerastes*.

GENERIC DESCRIPTION.—Male sex unknown. Female sex ovoid, apterous, surface closely covered with short, depressed, regularly spaced, chætiform hairs; peripheral margins of thoracic segments, with erect, longer, chætiform hairs. Head short and broad, nearly circular in outline; eyes lateral; interantennal portion of face weakly bullate; palpi robust, ultimate joint short, very broadly infundibuliform; antennæ short, blunt, nineteen to twenty joints, proximal and third joint subequal in length, second very short. Pronotum transversely sub-trapezoidal, subcucullate, caudal margin weakly convex; surface not impressed. Mesonotum with caudal margin faintly concave; metanotum with margin distinctly concave. Abdomen broad, margins of segments transverse (proximad) to markedly concave (distad). Supra-anal plate transverse, margin regularly arcuate with faint median emargination. Cerci very short, broad fusiform. Subgenital plate transverse, large, with meso-distal section markedly valvate. Limbs short and robust. Femora with ventral margins sparsely but distinctly spinulose; cephalic femora with ventro-cephalic margin bearing several proximal long spines followed by a series of very brief spinules and distad a very heavy long curved spine; genicular spine of median and caudal femora very heavy. Tibiæ subdepressed, broad; spination very heavy, of cephalic tibiæ fossorial in character, of extensor surface triseriate in disposition. Caudal metatarsus one and one-third times as long as remainder of tarsal joints, venter of same biserially spinulose. Pulvilli and arolia absent. Tarsal claws asymmetrical, margins unspecialized

GENOTYPE.—*S. jamaicanus*, new species.

***Simblerastes jamaicanus*, new species**

Plate XX, Figures 3 to 5

TYPE.—Female; Liguanea Plain near Kingston, Jamaica. July 5, 1920. (Hebard and Rehn; in débris under large pieces of abandoned termites' nest on ground.) [Hebard Collection, Type No. 859.]

Size small; form depressed.

Head completely concealed under pronotum when seen from dorsum; inflation of face distinct but not pronounced, extending from interocellar region to clypeal suture; ocelli indicated only by minute pale spots on internal side of scrobal depression. Palpi with antepenultimate joint robust, surpassing penultimate joint and nearly equal to ultimate joint; penultimate joint moderately infundibuliform, robust and short; ultimate joint with distal margin obliquely truncate.

Pronotum with cephalic margin short, arcuate; latero-cephalic angles broadly rounded-obtuse; lateral margins weakly arcuate; latero-caudal angles subrectangulate; greatest width at caudal fifth, greatest length contained one and one-half times in greatest width of same; strongly convex in transverse section.

Abdomen very broad, faintly broader even than metanotum; peripheral margins of segments, supra-anal plate and cerci with chætiform hairs of the shorter type. Cerci about half as long as supra-anal plate. Subgenital plate with margin bounding valvate section proximad concave; valves subdepressed, hirsute.

Caudal tibiæ with metatarsus about one and one-fourth times as long as remaining tarsal joints.

General color of dorsal surface dresden brown to tawny in adults, in immature individuals occasionally as pale as ochraceous-buff, the depressed, short, chaetiform hairs giving a golden sheen. Venter of same tone as dorsum except that of the abdomen is darker, nearer cinnamon-brown, of the pale immatures hardly darker. Eyes blackish brown. Tibial spines little darker than general color.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Greatest Width of Abdomen
♀, Liguanea Plain, Jamaica, type. .	4.78	1.59	2.52	3.44 mm.
♀, Liguanea Plain, Jamaica, para- type.....	4.62	1.42	2.35	3.27

In addition to the type we have before us seventeen adult female paratypes and forty-nine immature females bearing the same data as the type, also a single adult female taken from under a stone at night on the outskirts of Kingston, July 4, 1920, by Hebard. The adults are quite uniform in character, as well as in coloration. The immature series represents at least three instars preceding maturity, and it is noteworthy that no immature males are included. Of the adults three, one being the type, carried oöthecæ. That of the type is 2.01 millimeters long, by 1.42 deep; all are of a dull white color and superficially resemble seeds or grains of sand. The carina is sharply and finely marked, while the sides of the oötheca are irregularly impressed.

This interesting little cockroach occurred in numbers in fragmentary débris of a large abandoned termites' nest on the ground in the dry Liguanea Plain, a few miles northwest of Kingston. A park-like cover of mimosaceous trees is present over much of this plain and under these the ground is largely bare. The specimen taken on the outskirts of Kingston was secured at night by the aid of a flash-lamp, hiding under a stone in a field of short grass. To what extent the species is dependent upon the protection of termite or other structures remains to be determined, also the character and habits of the male sex.

LATINDIA Stål

***Latindia castanea* Brunner**

L[atindia] castanea BRUNNER, 1893, Proc. Zool. Soc. London, p. 604. ♀; Bal-tazar, Grenada, West Indies.

We have no material from the area studied which is referable to the genus *Latindia*. We, however, have made a comparison of Brunner's very brief and insufficient description of *castanea* with material of the rather widely distributed *L. dohrniana*, including one female from Trinidad,¹ and we feel that subsequent work will show the two are identical.² If the two names are found to be based upon the same species, *castanea* has some months priority and would have to be used in place of *dohrniana*.³

Latindia dohrniana is distributed from southern Vera Cruz, Mexico, south to Panama, east to Trinidad.

PHOLADOBLATTA,⁴ new genus

Related to *Myrmecoblatta* Mann⁵ and *Phorticolea*⁶ and *Atticola*⁷ Bolivar. *Myrmecoblatta* and *Atticola* are supplied with tegmina, like the present genus, while *Phorticolea* is apterous, but it shows, however, much similarity to *Pholadoblatta*. From *Myrmecoblatta* the present genus differs in the pronotum of the male lacking the strong lateral "gutters" the pronotum in section being arcuate and without the Perisphærid-like form found in *Myrmecoblatta*; in the abdomen being relatively narrow, instead of broad and depressed; in the shorter eyes and broader head; in the less robust antennæ; in the less marked difference in proportions of the ultimate and penultimate maxillary palpal segments; in the asymmetrical and divided subgenital plate of the male; and in the elongate limbs, which have the tarsi with distinct arolia and appreciable pulvilli. From *Phorticolea* the new genus can be separated by the male possessing quite well developed tegmina, in the limbs apparently being more slender, and in the character of the male subgenital plate, which is entire and with two regular styles in *Phorticolea*. From *Atticola* Bolivar, known solely from the female sex, *Pholadoblatta* apparently differs in the shape of the head, which is elongate subtriangular in *Atticola*; in the non-fimbriate pronotum, which in transverse section shows no reflexions laterad, as occur in *Atticola* (and also in *Myrmecoblatta*); in the tegmina

¹This specimen, received from Prof. Lawrence Bruner, was recorded by him as *castanea* (1906, Journ. N. Y. Entom. Soc., XIV, p. 143), which is independent confirmatory support of the suggestion regarding the identity of *castanea* and *dohrniana*.

²Hebard (1921, Proc. Acad. Nat. Sci., Phila., p. 215, footnote 29) already has suggested the synonymy of *castanea* and *dohrniana*.

³*Latindia dohrniana* Saussure and Zehntner, 1894, 'Biol. Cent.-Amer., Orth.', I, p. 111, Pl. v, fig. 7, ♀; Guatemala.

⁴From *φωλάς*, lurking in a hole, in allusion to the habitat of the genotypic species.

⁵1914, Psyche, XXI, p. 172. Genotype (by original designation): *M. rehni* Mann. We have before us two paratype individuals of *M. rehni*, and the type, a paratype and other authentic material of *M. wheeleri* Hebard.

⁶1905, Mitth. Schw. Entom. Gesell., XI, p. 138. Genotype (by monotypy): *P. testacea* Bolivar.

⁷Idem, p. 140. Genotype (by monotypy): *A. mortoni* Bolivar.

being relatively large and covering basal half of abdomen (σ^7), instead of trigonal and lobiform as in *Atticola* (φ); as well as in less evident features of limb difference. Probably male sexual features of *Pholadoblatta* will be found to differentiate it further from *Atticola*, when that sex of the latter genus is known.

The relationship of this genus to *Nothoblatta* Bolivar and *Attaphila* Wheeler, other minute myrmecophilous blattids, is not sufficiently close to require detailed comment. *Nothoblatta*, in the male, possesses elongate tegmina, reaching beyond the apex of the abdomen, and perfectly developed wings, the caudal margin of the pronotum is broadly rounded and the male subgenital plate is undivided; *Attaphila* has a very robust build, a marked villose covering, and very different limb specialization. Of these genera the first is, by inference, considered an ectobiid by Bolivar, and *Attaphila* is now given a position in the Corydiinae, where we feel all of these aberrant myrmecophilous blattid genera probably belong. In the present condition of our knowledge of them the assignment must be considered as purely provisional, but this action is warranted by the indicative character of the external features of these insects. Their specialization is so highly developed that some of the supposedly more important characters of the group are masked or modified, but others, though more subtle, remain undisturbed.

GENERIC CHARACTERS.—Size minute; form elongate elliptical; surface of pronotum and tegmina with sparse covering of short pile. Head regularly convex on face and laterad, broad ovoid in outline, greatest depth nearly equal to greatest width; ocelli and ocellar areas sub-obsolete; eyes well developed, reaching slightly ventrad of level of ventral margins of antennal scrobes; palpi with ultimate and penultimate joints compressed, ultimate joint acute lanceolate in lateral outline; antennæ heavy, filiform, proximal joint obconic, joints distad of third moniliform, those proximad very short and transverse, increasing in length distad. Pronotum nearly semicircular in outline, lateral and cephalic margins nearly regularly arcuate, caudal margin weakly arcuate emarginate, latero-caudal angles rounded rectangulate; in transverse section the pronotum is strongly arcuate. Tegmina corneous, reaching to, or slightly distad of, middle of abdomen, each tegmen subquadrate to subrectangulate, disto-costal angle broadly rounded, no apparent venation but usual position of humeral trunk indicated. Wings rudimentary, reaching to base of abdomen and completely hidden under the tegmina. Abdominal tergites of male unmodified. Ventral surface of abdomen with exposed lateral triangular accessory plates projecting caudad at caudo-lateral section of the sternites.¹ Subgenital plate of male asymmetrical, fissate, with a marked sinistral style and a rudimentary dextral one. Limbs elongate, particularly caudal pair; tarsi elongate, with pulvilli and arolia. Cephalic femora having ventral margins

¹These resemble very greatly similar structures illustrated by Adelung as occurring in the African "*Blatta lobiventris*", 1905, *Annuaire Mus. Zool. Acad. Impér. Sci. St. Pétersb.*, IX, p. 423, Fig. 1a.

with series of closely placed hairs, that of cephalic margin pectinate in the closeness and regularity of the hairs; caudal femora with a brief series of short spines distad on each ventral margin; caudal tibiae with margins briefly spined, those on extensor surface arranged triseriately; caudal tarsi with metatarsus slightly longer than remaining joints combined, ventral surface of metatarsus, and a lesser degree of remainder of tarsus, multispinulose.

GENOTYPE.—*Pholadoblatta inusitata* (Rehn).

As to the proper position of this remarkable genus in a linear arrangement of the Corydiinae, little can be given, at this time, additional to that indicated above in the diagnostic comparison of the genus. Its points of difference from the related genera, known from the male sex, are such that it is probably more nearly related to *Phorticolea* than to *Myrmecoblatta*, but its affinity with *Atticola* is certainly close, even though the male of the latter genus is unknown. The pronotal form of the latter, however, shows an approach toward that of *Myrmecoblatta*, from which *Atticola*, on the other hand, is at once distinguished by possessing arolia and lobiform tegmina, the latter in the female sex. The ambisexual value of these characters however, remains, to be determined.

***Pholadoblatta inusitata* (Rehn)**

Plate XX, Figures 6 to 8

- Aphlebia inusitata* REHN, 1906, Bull. Amer. Mus. Nat. Hist., XXII, p. 113. ♂;
• Andros Island, Bahamas.

CUBA.—Camoá, Havana Province, (José Cabrera), 1 ♂, [A. N. S. P.].

We also have before us the male type of this species, taken in May to June, 1904, by Dr. Wm. M. Wheeler, from "the galleries of a large nest of a jumping ant (*Odontomachus hæmatodes insularis* Guérin var. *pallens* Wheeler)."¹

Examined anew in the light of present day knowledge of the family it seems desirable to present some critical information concerning this most interesting ant-guest blattid, additional or supplementary to that in the original description. These features have been taken from the type.

Head with interspace between eyes at occiput nearly twice width of interspace between antennal scrobes: occipital outline, from facial aspect, broadly but regularly arcuate: eyes little projecting, individual facies sharply marked.

Pronotum with greatest length contained one and one-third times in greatest width, moderately cucullate over head, which is completely covered when seen from dorsum; lateral sections appreciably declivent, particularly cephalo-laterad; all margins narrowly cingulate.

¹Wheeler in Rehn, *vide supra*.

Tegmina relatively broad for truncate tegmina in a species of the general proportions of the present, the costal sections projecting laterad of the pronotum and the thorax and base of abdomen; greatest width contained one and three-fifths times in greatest length of tegmen, subquadrate; disto-costal angle very broadly rounded, costal margin passing broadly into the distal one; disto-sutural angle much more narrowly rounded; costal field appreciably recurved dorsad in a broad but shallow gutter-like concavity.

Supra-anal plate very short, broad, margin subarcuate, the plate almost hidden under preceding tergite;¹ latter transverse, with its distal margin sinuato-emarginate at cercal bases and with a slight median emargination, caudo-lateral angles appreciably produced, rectangulate. Cerci broad fusiform, tapering distad, nearly twice length of penultimate tergite. Subgenital plate asymmetrical, axis directed slightly dextrad, obliquely fissate disto-mesad, but the divided portions closely overlapping; median section of plate with a produced rectangulate projection sinistrad of median fissure; a marked and fully developed style inserted at dextral base of plate; dextrad margin of plate is obtusely arcuate; in section plate is weakly rostrate mesad.

Length of body, 4.37 mm.; length of pronotum, 1.43; greatest width of pronotum, 2.1; length of tegmen, 2.1; greatest width of tegmen, 1.3; greatest width of abdomen, 1.9; length of caudal tibia, 1.47; length of caudal tarsus, 1.5.

The Camoa, Cuba, individual differs from the type in the following noteworthy features:

Tegmina more ovoid rectangulate, appreciably longer than in type, reaching to base of antepenultimate tergite, greatest width contained about one and three-fourths times in greatest length of tegmen; both distal angles broadly rounded, distal margin thus almost evenly arcuate, although the disto-costal angle is more extensively rounded than the disto-sutural.

Subgenital plate with divided portions not overlapping, as in type.

Length of body, 4.11 mm.; length of pronotum, 1.42; greatest width of pronotum 1.84; length of tegmen, 2.18; greatest width of tegmen, 1.26; greatest width of abdomen, 1.68.

This genus and species is the only blattid which is presumably a myrmecophile, known from the West Indies. Other genera associating with ants, and known or presumed to be dependent upon their associates, are found in the American tropics and subtropics, in central Texas, Mexico, southeastern Brazil, Uruguay and Argentina. When our knowledge of these minute forms of secretive habits is much more complete, the apparent geographic isolation of *Pholadoblatta* doubtless will appear less remarkable.

Oxyhaloinæ

The subfamily Oxyhaloinæ is made up of three major assemblages of genera, which future study may show have less in common than generally supposed. Representatives of all three of these groups occur in the West Indies. The groups center about the genera *Oxyhaloa*, *Chorisoneura* and

¹This is called the "supra-anal plate" in the original description.

Plectoptera, the latter two assemblages of small or very small forms, while the group containing *Oxyhaloa* is chiefly made up of average-sized species. All three have peculiarities in the folding of the wings, the extreme condition of complexity in the folding and storing of these very ample appendages being found in *Plectoptera*. Certain of the members of this group bear a great resemblance to coccinellid beetles, and the genus *Chorisoneura* also shows a most bewildering array of specific combinations of general form and coloration details. All three groups are found in both hemispheres, although in America the *Oxyhaloa* assemblage is represented by but one species (*Oxyhaloa buprestoides*), which occurs in Cuba, Mexico and Central America, and is quite probably an accidental introduction. The position of Brunner's genus *Anaptycta* is very uncertain (see p. 298), and it is, for that reason, not included in the following key.

KEY TO WEST INDIAN GENERA OF OXYHALOINÆ

1. Form deplanate. Tegmina with marked venation. Wing with or without a pronounced intercalated triangle in the wing, but no reflexed appendicular field. 2.
 Form convex dorsad, coleopteroid. Tegmina with venation weakly indicated, never elevated. Wing with greatly developed and, in repose, reflexed appendicular field. (Size very small.) *Plectoptera* Saussure.
2. Texture of tegmina entirely coriaceous (except normally covered portion of dextral tegmina.) Wing with no intercalated triangle. Ulnar vein of wing with a regularly pectinate series of short rami, evenly distributed to apex of wing. (Size medium.) *Oxyhaloa* Brunner.
 Texture of tegmina never coriaceous, frequently with marginal and scapular fields translucent. Wing with intercalated triangle very ample, sharply marked off from remainder of wing. Ulnar vein of wing without regularly pectinate series of rami. (Size small.) *Chorisoneura* Brunner.

Oxyhaloa buprestoides (Saussure)

- Bl[atta] buprestoides* SAUSSURE, 1862, Rev. et Mag. de Zool., (2) XIV, p. 166.
 • ♂; Cuba.
O[xyhaloa] murrayi BRUNNER, 1865, 'Nouv. Syst. Blatt.,' p. 253, Pl. vi, fig. 25.
 ♀; Old Calabar (West Africa).
Nauphæta aspersata KIRBY, 1900, Ann. and Mag. Nat. Hist., (7) V, p. 285. Sex?; Pretoria, Transvaal.

CUBA.—Baracoa, Oriente Province, IV, 1915, 3 ♀, [Davis Cln.].
 Jauco, Oriente Province, IV, 1915, 2 ♀, [Davis Cln.].

For sixty years this species has been known from Cuba, to which island it was supposed for many years to be peculiar, but its real relationship to the Old World members of the genus had never been established.

No other species of this dominantly African genus has been reported from America. The probable reason the true relationship of *buprestoides* to the African forms of the genus has never been determined, appears to be that no cohesive or coordinated work has been done on the genus since 1865, and at that date Brunner was unacquainted with *buprestoides*, except for its original description. There can be little question but that *buprestoides* is another slave ship introduction from West Africa, and in Cuba it appears to be limited to the eastern portion of the island, and in fact to Oriente Province. The only previous exact records from Cuba are Bayamo, Baracoa and Yateras (Gundlach), and sixty miles west of Santiago (Rehn). Saussure and Zehntner have reported the species from Mexico and Guatemala, which possibly represent direct African introductions, or more probably an expansion of the Cuban colony, through the port of Santiago.

In explanation of the synonymy given above, we have carefully compared Cuban material with individuals of both sexes from Bitje, Ja River, Cameroons, in the collection of the Academy, and females from Koedoes River, Transvaal, in the same collection. The former series is clearly representation of *murrayi* Brunner, the latter is equally so of *aspersata* Kirby. No appreciable difference which could have any specific importance is evident, and there seems no alternative but to unite the three names. Of these *buprestoides* is the oldest, and we have the peculiar situation of a name based, undoubtedly, on a relatively recent colonization of the species, having priority over others based on the species as occurring in its native land.

What relationship *buprestoides* has to the Abyssinian *O. ferreti* Reiche and Fairmaire remains to be determined, as no comparable material is available, but *ferreti* is apparently distinct, judging from the original information. The latter name is some years older than *buprestoides*.

This species has been well described and figured by Saussure,¹ while the wing structure also has been illustrated by the same author.² Distant³ has given a good colored figure of the species.

CHORISONEURA Brunner

In South America this genus is represented by a very considerable number of species, differing in form, tegminal texture and color, as well as size, although all are small. In Central America we find a small

¹1864, Mém. Hist. Nat. Mex., III, p. 116; Pl. I, fig. 20.

²1870, Miss. Scient. Mex., Rec. Zool., VI, p. 90, Pl. II, fig. 48.

³1900, 'Insecta Transvaal,' I, Pl. I, fig. 8.

number of forms, while in the United States but a single one is found in the Southern States. In the West Indies but two definitely known species occur, both of which are here described, although a record of a questionable determination may add another. From the relationships exhibited by the two species it would appear logical to believe they reached the West Indies by different routes, i. e., the Barbadian one from South America, the Jamaican form from Central America.

As we feel very certain the West Indian records of *Chorisoneura mysteca* are erroneous determinations, and probably relate to *C. barbadensis*, here described, we are omitting *mysteca* from the following key.

Face solidly blackish brown. Interocular region solidly cream-colored, non-lineate transversely. Pronotum with a median discal pair of arcuate opaque light ochraceous-buff lines, in addition to bars of similar coloring along the cephalic and caudal margins of the pronotum; pronotal disk with base color darker laterad than mesad. Distal portion of tegmina more sharply attenuate and acute, this portion of costal margin more straight convergent to apex. White pencilling of tegminal veins more complete and pronounced, more contrasted with base color, all of axillary veins pencilled. (Barbados.) *barbadensis*, new species.

Face ochraceous, cream-colored laterad. Interocular region transversely quadri-lineate, alternating dark lines and cream-colored lines. Pronotum without paired pale lines within disk, but vicinity of cephalic and of caudal margins with pale transverse bars; pronotal disk with base color not darker laterad than mesad. Distal portion of tegmina less sharply attenuate, although still acute, this portion of costal margin weakly but very appreciably arcuate to apex. White pencilling of tegminal veins less complete and pronounced, not as contrasted with base color, those axillary veins nearest to anal sulcus alone pencilled. (Jamaica.)

formosella, new species.

***Chorisoneura barbadensis*, new species¹**

Plate XX, Figures 9 to 11

Chorisoneura mysteca REHN, 1905, Entom. News, XVI, p. 175. (Not *Blatta mysteca* Saussure, 1862.) Barbados.

Originally considered by Rehn to be *mysteca* Saussure, this insect is now seen to be very different, and in general appearance far more nearly related to *C. formosella*, described below, *panamæ*,² *gemmicula*,³ *specilliger*⁴ and *guianæ*⁵ Hebard, and *albonervosa*,⁶ Rehn, with typical material of all

¹There exists a possibility that this species may be a near relative of Brunner's very poorly described *Anaptycta bipunctulata* (*vide infra*), in which case *Anaptycta* would become a synonym of *Chorisoneura*.

²1920, Mem. Amer. Entom. Soc., No. 4, pp. 125, 127, Pl. vi, figs. 9 and 10. ♂, ♀; Porto Bello (type loc.) and Rio Trinidad, Panama.

³1920, Idem, pp. 126, 138, Pl. vi, figs. 20 to 22. ♂, ♀; Cabima (type loc.), Alhajuela, Porto Bello and Rio Trinidad, Panama.

⁴1920, Idem, pp. 126, 135, Pl. vi, figs. 16 to 19. ♂, ♀; Gatun (type loc.), Paraiso, Porto Bello, Rio Trinidad and Juan Mina, Panama.

⁵1921, Proc. Acad. Nat. Sci., Phila., p. 217, Pl. xiv, figs. 11 and 12. ♂, ♀; Bartica, British Guiana (type loc.); Cayenne, French Guiana.

⁶1916, Trans. Amer. Entom. Soc., XLII, p. 255, Pl. xiv, figs. 21 and 22. ♂; Pará, Brazil.

of which it has been compared. The Panamanian *panamæ* and the Guianan *guianæ* represent a different species group from *barbadensis* and its closer relatives. These two species have in common a tessellate pattern of the discoidal and anal fields of the tegmina, instead of a longitudinal clear hyaline lining, as well as a type of face and occiput coloration not seen in the other group. Comparison with *C. formosella* from Jamaica is made in succeeding pages under that species. *Barbadensis*, *formosella*, the Panamanian *gemmicula* and *specilliger*, and the Brazilian *albonervosa* have in common the veins of the discoidal and anal fields of the tegmina lined with whitish, and the face black with occiput cream-colored, or if face is not black the occiput has two narrow transverse cream-colored lines (*formosella* and *specilliger*). The present species differs from *specilliger* in having the face black, the disk of the pronotum with two median, comma-shaped whitish markings, and the styles of the male subgenital plate shorter and stockier: from *gemmicula* in the occiput lacking a narrow transverse blackish line on the cream-colored base, in the shape of the paired median white markings of the pronotal disk, and in the styles of the male subgenital plate being of a different shape: from *albonervosa* in the face and most of occiput not solidly black, in the more numerous discoidal sectors and anal veins, which also are clear hyaline narrowly margining the veins, while the styles of the males are very similar in structure.

TYPE.—Male; Barbados, West Indies. October, 1902. (Miss Field.) [Academy of Natural Sciences of Philadelphia, Type No. 5382.]

Size relatively small (for genus); form appreciably deplanate; surface shining.

Head visible cephalad of pronotum for its entire width; in shape broad cordiform, greatest width subequal to greatest depth, ventral section of head sharply narrowing from eyes to buccal region; occipital outline transverse truncate, interspace between eyes broad, equal to one and one-quarter times occipital depth of eye; face weakly convex. Palpi slender; antepenultimate joint slender, elongate, subequal; penultimate joint moderately infundibuliform, two-thirds as long as antepenultimate joint; ultimate joint faintly longer than penultimate and slightly shorter than antepenultimate joint; deepest at base, tapering distad. Eyes prominent. Antennæ incomplete.

Pronotum of the type found in the related species, greatest length contained nearly twice in greatest width; cephalic margin weakly convex; lateral margins broadly and strongly arcuate; caudal margin truncato-arcuate.

Tegmina elongate, acute lanceolate, surpassing apex of abdomen by nearly greatest width of pronotum; greatest width of tegmen, at proximal third, contained slightly more than three times in greatest length of same; costal margin strongly arcuate proximad, nearly straight thence to the acuminate apex, which is very narrowly rounded; sutural margin moderately arcuate distad, strongly arcuate proximad, straight for a considerable mesal section; marginal field broad, well continued distad; scapular field at broadest point equal in width to one-half that of tegmen; anal field

elongate pyriform, in length equal to one-third that of entire tegmen; venation decided; costal veins of tegmina fifteen in number, proximal ones well arcuate, distal ones nearly straight oblique; discoidal sectors moderately oblique, several bifurcate; anal sulcus strongly arcuate proximad, straight oblique thence to its junction with sutural margin; axillary veins five in number. Wings with intercalated field relatively large (for the genus), reaching one-fifth of the wing length toward the base; medio-discoidal area slightly broader than widest section of medio-ulnar area, former regularly broken into subquadrate areolets by transverse nervures; costal veins elongate sub-clavate at their distal extremities; ulnar vein furcate distad.

Abdomen with supra-anal plate transverse, broadly and obtusely produced mesad, distal extremity rather broadly truncate. Cerci elongate, depressed, ensiform, quite broad at proximal third, acuminate distad, joints sharply defined. Subgenital plate small, somewhat unsymmetrical, sinistral side with margin proximad of styles more arcuately lamellate than on dextral side, between styles margin of plate is produced into a short, recurved, claw-like structure; styles in shallow sockets, large, subequal, closely placed, nearly symmetrical in form, bulbous proximad and tapering sharply to narrow apices (Plate XX, fig. 11), which are depressed in a plane transversely oblique to that of the style itself, internal margin of styles nearly straight, external margin of styles strongly sigmoid, internal section of ventral surface longitudinally concave.

Femora with ventral margins virtually unspined, some of the hairs, however, chaetiform in their development; disto-ventral spine on cephalic faces of all femora large, particularly so on cephalic femora; genicular spine of median and cephalic femora large, recurved. Arolia large; tarsal claws unequal; fourth joint of tarsus alone with pulvillus.

General color zinc orange, paling toward ochraceous-salmon on venter. Head with base of occiput buckthorn brown, a broad transverse bar of pale ochraceous-buff between eyes, extending as a narrow line about meso-ventral section of eyes; face blackish brown; antennal scrobes pale ochraceous-buff; eyes mummy brown. Pronotum with broad lateral sections clear hyaline; disk with paired elongate reniform areas of russet, separated by a median area of zinc orange; cephalic margin heavily and caudal margin more narrowly opaque pale ochraceous-buff. Tegmina with discoidal field and all of scapular field except narrow section adjacent to discoidal vein clear hyaline; all venation except anal sulcus pencilled clear hyaline on ground of general color. Wings washed with pale cinnamon-buff; distal section of mediastine vein and a continuation for some distance distad across median section of costal veins, bister. Abdominal sternites narrowly edged with opaque pale ochraceous-buff, the distal section of the sternites with a considerable area of the same tone; pleura with areas of opaque pale ochraceous-buff. Limbs light ochraceous-buff.

Length of body, 7 mm.; length of pronotum, 2; greatest width of pronotum, 2.9; length of tegmen, 7.9; greatest width of tegmen, 2.5.

The type of this beautiful species is unique.

Chorisoneura formosella, new species

Plate XXIV, Figures 7 and 8

Closely related to *C. translucida* (Saussure) from Mexico and Central America, also *barbadensis*, described above, *gemmicula* and *specilliger* Hebard, from Panama, and *albonervosa* Rehn, from Amazonian Brazil.

From *translucida* the nearest relative of *formosella*, the chief characters of distinction of the latter are the much finer character of the dark line separating the creamy white lines of the occipital region, the straighter and less arcuate proximal half of the discoidal and median veins of the tegmina, the less numerous albolineate axillary veins of the tegmina and the more attenuate cerci. From *gemmicula* the lack of black on the face in *formosella*, the more numerous albolineate axillary veins of the tegmina and the more elongate and attenuate cerci are differential characters, while from *barbadensis* the present insect most strikingly differs in the pronounced transverse light and dark lineations of the occiput, in the pale face, in the more uniformly ochraceous circular disk spot of the pronotum and in the blunter tegmina, which have the base tone less markedly bicolored and the white pencilling of the veins more delicate and less complete. From the Brazilian *albonervosa*, *formosella* is chiefly separable by the absence of black from the occiput and face, the different character of the transverse interocular occipital bars, the pale instead of blackish antennæ, the more regularly arcuate costal margin of the tegmina, which latter also have the apices more sharply acute, and in the more complicated tegminal venation.

From *specilliger*, of Panama, the present species can at once be separated by the more decided interocular dark bars, pale antennæ, less regularly elliptical pronotum, less numerous tegminal rami and less complicated white lineate tegminal pattern.

Hebard's *gatunæ*, from Panama, has some resemblance to *formosella*, but the latter differs from the former, and agrees with all of the species with which it has been compared above, in the more circular pronotal disk and the broader marginal field of the tegmina.

The fact that the Jamaican insect is more closely related to the mainland *C. translucida* than it is to the Lesser Antillean *C. barbadensis* is faunistically significant.

TYPE.—Male; between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. Elevation, 4400 feet. July 24, 1923. (Rehn; swept from huckleberry trees (*Vaccinium meridionale*).) [Academy of Natural Sciences of Philadelphia, Type No. 5422.]

Size medium (for genus); form as in related species; surface highly polished.

Head markedly deplanate, broadly visible cephalad of the pronotum when seen from dorsum, seen in facial aspect the greatest depth of head is about five-sixths greatest width across eyes; occipital interspace between eyes slightly more than twice as great as occipital depth of eye. Palpi moderately elongate; penultimate joint about three-fourths as long as antepenultimate joint, infundibuliform; ultimate joint subequal in length to antepenultimate joint, relatively shallow.

Pronotum transversely elliptical, greatest width faintly greater than one and one-half times pronotal length; cephalic margin broadly arcuate, arcuation faintly more pronounced in an area equal in width to that of occiput between eyes, regularly passing laterad into the broadly arcuate lateral margins, which pass caudad by rounded yet evident caudo-lateral angles into the very weakly arcuate caudal margin; point of greatest width virtually at middle; disk area circular in form: surface appreciably deplanate, weakly and broadly declivent laterad; surface of disk with a median shallow but evident and roughly reversed horseshoe-shaped depression.

Tegmina acute lanceolate, greatest width, which is slightly proximad of middle, contained three and two-fifths times in greatest tegminal length: costal margin well arcuate proximad, in distal section much less arcuate and regularly approaching the acute but very narrowly rounded apex; sutural margin largely straight, briefly arcuate proximad, weakly indented at anal sulcus and distad curving to apex: marginal field broad, equal in width to one-half of anal field, extending distad slightly beyond apex of anal field; scapular field broad, at widest point nearly equal to half of tegmen; anal field relatively short, acute sub-pyriform: costal rami of all character eleven; axillary veins five in number; anal vein meeting sutural margin at acute angle. Wings fully developed.¹

Cerci fusiform, greatest width at proximal fourth, regularly tapering in distal half, apparently composed of nine segments, these well marked and clearly indicated in moniliform fashion except proximad, in extent distad slightly surpassing apex of subgenital plate. Supra-anal plate transverse, trigonal produced meso-distad, apex distinctly but not greatly V-emarginate mesad. Subgenital plate large; moderately produced meso-distad, apex distinctly V-emarginate for slightly more than a fourth of length of plate.

Limbs as described for *C. barbadensis*.

General color of occiput, disk of pronotum and dorsal surface of abdomen and general tone of wings as seen through tegmina ochraceous-orange; lateral portions of pronotum and marginal field of tegmina nearly clear hyaline. Pronotum with narrower transverse section cephalad and broader similar bar along caudal margin opaque light ochraceous-buff; disk of pronotum with a pair of darker (nearer tawny) clouds cephalad, which may become (type) confluent caudad. Tegmina with anal, discoidal and section of scapular fields near humeral trunk washed with clay color, costal section of scapular field clear hyaline, passing without sharp division into infumate section; humeral trunk, proximal section of each of costal veins, discoidal sectors and two outer axillary veins finely pencilled to a greater (paratype) or lesser (type) degree with whitish; portion of costal veins in clear hyaline section of scapular field and discoidal sectors in normally covered portion of right tegmen and inner axillary veins,

¹As but two specimens of this species are known we have refrained from spreading either one, on account of the possibility of damage. As most excellent differential characters are elsewhere fully evident, the hazard does not seem warranted at this time, and the description of the wing structure may well await the acquisition of additional material.

not pencilled. Interocular space with a dorsal transverse bar ranging from ochraceous-orange (paratype) to dark chestnut-brown (type), followed ventrad by an equally broad transverse bar of cream-color (paratype) to ochraceous-buff (type), then another narrower bar of chestnut-brown and finally another pale bar similar in tone and width to the more dorsal pale one; face pale ochraceous-orange mesad, passing to cream-color laterad; palpi and antennæ light ochraceous-buff; eyes dresden brown (paratype) to mummy brown (type). Venter of thorax and limbs cinnamon-buff (paratype) to clay color (type); ventre of abdomen light ochraceous-buff, with large discal spot on subgenital plate reaching to and involving much of caudal margin, cinnamon-brown. Cerci pale.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen	Greatest Width of Tegmen
♀, type.....	7.5	1.8	2.8	8.5	2.5 mm.
♀, paratype.....	8	1.7	2.5	7.2	2.2

In addition to the type we have before us a single paratypic female, taken near Bog River, Portland Parish, Jamaica, April 18, at night, by A. E. Wight, and from the collection of the Museum of Comparative Zoölogy.

The type bears an oötheca, which is carried with the sparsely crenulate ridge dorsad, the border, which is ventral, resting in the emargination of the subgenital plate. The exerted portion of the oötheca is three millimeters long.

It is evident from the material before us that the species exhibits considerable variation in general size, as shown by the measurements given above, and also to a certain degree in the depth of the coloration,

The type was taken while sweeping sprigs of huckleberry tree branches nearly ten feet from the ground, in a heavy patch of relatively dry leeward slope type forest.¹ Numerous efforts were made that day and subsequently to secure in that and similar spots additional material of the species, and particularly a male, but without success.

Chorisoneura mysteca Saussure

Bl[atta] mysteca SAUSSURE, 1862, Rev. et Mag. de Zool., (2) XIV, p. 167. Sex?; "Mexico calida."

This Central American species was recorded from Grenada by Brunner² and from Barbados by Rehn (*vide supra*). The latter reference

¹See Shreve, 1914, Publ. No. 199, Carneg. Inst. of Wash., pp. 33-35.

²1893, Proc. Zool. Soc., London, p. 601, Mirabeau Estate, Grenada.

we now know to be incorrect, the species being here described as *C. barbadensis*. Whether the Grenadan insect is the same as the Barbadian one remains to be determined, and we have no alternative, without material, but to permit the record to remain under *mysteca*, from which we feel quite certain Brunner's specimen is distinct.

Anaptycta bipunctulata Brunner

A[naptycta] bipunctulata BRUNNER, 1892, Proc. Zool. Soc., London, p. 202, Pl. xv, figs. 1a-1b. Sex?; St. Vincent, British West Indies.

This genus and species is very briefly described and atrociously figured by Brunner, and its real affinity is uncertain. We have seen no material from the area studied which would be referable to *Anaptycta*, and we are very dubious of its generic distinctness from *Chorisoneura*. Brunner states that the genus is related to *Anaplecta* (*vide* Ectobiinæ), but differs in the ulnar vein of the tegmina emitting pectinate rami toward the posterior (sutural) margin and in the femora being unarmed beneath. The latter character would remove *Anaptycta* from the proximity of *Anaplecta*. and associate this type of blattid more nearly with *Chorisoneura*. Oblique rami of the ulnar vein of the tegmina are found in *Lissoblatta* Hebard, an ectobiine relative of *Anaplecta*, and also in *Chorisoneura*, but in neither case is this pectination of the orthodox and conventionalized type figured by Brunner. Whether his figure is correct or exaggerated remains to be determined; the description is certainly too brief and unconvincing for trustworthy deduction without material.

Brunner states that of the three specimens seen by him, two were beaten from branches, at an elevation of 1000 feet, in the forest above Châteaubelais, in September. The third specimen possessed no exact data.

PLECTOPTERA Saussure

This genus of strikingly formed and colored, though relatively minute, cockroaches is peculiar to the American tropics, and we have reason to feel that a very large part of its evolutionary development has taken place in the West Indies. Quite a few species are known from Central America, but the diversity of specific features there found is not as great as in the West Indian forms.

All the members of the genus possess very strikingly developed wings; the very large appendicular field, which has a longitudinal fold as well as being reflexed in its entirety, is exceeded in proportionate size in no other genus of Blattidæ.

The species of the genus *Plectoptera* all are foliage and flower frequenters, generally secured by beating low arborescent vegetation, or are attracted to light.

Females of the species are relatively difficult to determine, as the chief specific differential features are in the shape of the male subgenital plate and the styles. In the majority of the species these are fixed in character and show little variation, but in *P. porcellana* we find, as is frequently the case, a species far more plastic in this respect than is true of the other related forms. The separation of the species is quite difficult and the features are subtle, so that reference to the accompanying figures must be made to understand clearly the species here discussed.

Color features are of considerable importance in this genus, but chiefly in the assembling of the species into groups. The segregational types of coloration we have provisionally recognized appear to be as useful in the grouping of the Central American forms. However, it must be realized that the essential diagnostic specific features are in the male genitalia, although the color lines apparently represent phylogenetic stocks. As the character of complicated genitalic features is not readily expressed in words, we have contented ourselves with a group key to the forms, which verbally is not as complete as we would prefer, but we have given references, to our figures, which will greatly assist in specific recognition.

- A. Group with a mosaic-like densely punctate pattern of tegmina, occasionally becoming somewhat irregularly minute vermiculate (*pygmæa*); anal field of tegmina frequently dark fuscous and solidly colored. Pronotal disk frequently (generally in *porcellana*) solidly fuscous.

Porcellana Group { *porcellana* Saussure (Cuba)
(Pl. XXI, figs. 1-4; XXII, figs. 4-6; XXIII, figs. 1-3.)
dorsalis (Burmeister) (Porto Rico)
(Pl. XXI, fig. 5; XXII, figs. 7, 13-14; XXIII, figs. 4-5.)
pygmæa (Beauvois) (Hispaniola and Jamaica)
(Pl. XXI, figs. 6-7; XXII, fig. 8; XXIII, fig. 6.)

- B. Group with tegmina having a delicate and very fine pale lineolate pattern of principal and axillary veins, with pale vermiculate punctulations between veins; anal field of tegmina not solidly dark fuscous. Pronotal disk not solidly infusate.

Rhabdota Group { *rhabdota*, new species (Porto Rico)
(Pl. XXI, figs. 8-9; XXII, fig. 9; XXIII, fig. 7.)
perscila, new species (Dominica)
(Pl. XXII, figs. 1, 10; XXIII, fig. 8.)

- C. Group with a mosaic punctate pattern of tegmina, not as dense nor as delicate as in group A, occasionally subobsolete (probably due to method of preservation); anal field of tegmina never solidly dark fuscous. Pronotal disk not infusate.

- Vermiculata* Group { *vermiculata*, new species (Cuba)
(Pl. XXII, figs. 2, 11; XXIII, fig. 9.)
lacerna, new species (Cuba)
(Pl. XXII, figs. 3, 12; XXIII, fig. 10.)
- D. Group with non-punctulate or non-lineate, uniformly pale tegmina. Pronotal disk never solidly dark fuscous.
- Poeyi* Group { *poeyi* (Saussure) (Florida, Cuba)
infulata, new species (Porto Rico)
(Pl. XXIII, fig. 11.)
dominicæ, new species (Dominica)
(Pl. XXIII, figs. 12-13.)

The color types of groups A and B, would not seem very distinct from the features given above, but a comparison of representatives of the two show a real, though subtle, difference in character of the punctulations. The pattern of group B is a distinctive one, clearly recognizable when once grasped. Group A shows a considerable range in intensification and recession of the pattern, the latter having the dense and finely punctulate mosaic pattern uniform, except for wavy pale cloudings and principal vein linings, while the intensive has the anal field solidly dark fuscous. Group D is composed of forms greenish yellow in tone.

Hebard¹ has given a concise presentation of the generic characters of *Plectoptera*.

***Plectoptera porcellana* (Saussure)**

Plates XXI, Figures 1 to 4; XXII, Figures 4 to 6; XXIII, Figures 1 to 3

Bl[atta] porcellana SAUSSURE, 1862, Rev. et Mag. de Zool., (2) XIV, p. 164. Sex?; Cuba.

Plectoptera krugi SAUSSURE AND ZEHNTNER, 1893, 'Biol. Cent.-Amer., Orth.,' I, p. 85. ♂, ♀; Cuba.

CUBA.—Cotorro, Havana Province, III, 3, 1921, (José Cabrera), 2 ♂, 1 ♀, [A. N. S. P.]. Cayamas, Oriente Province, III, 3, 11, 12, V, 24 and 28, XII, 19 and 24, (E. A. Schwarz), 4 ♂, 7 ♀, [U. S. N. M. and A. N. S. P.]: (Baker), 1 ♀, [A. N. S. P.]. Cristo, Oriente Province, X, 3, 1913, (F. E. Lutz), 1 ♀.

The synonymy of *Plectoptera krugi* is perfectly evident when a series of *porcellana* is examined. The type of coloration described as *krugi* is represented in the series before us, and passes regularly into the more usual phase of *porcellana* with the anal field of the tegmina solidly and contrastingly infusate. The very subtle yellowish punctulato-lineations stressed in the description of *krugi* are particularly evident in recessively colored specimens, and care should be taken that this type of

¹1917, Mem. Amer. Entom. Soc., No. 2, pp. 250-257.

coloration is not confused with that of the Porto Rican *P. rhabdota*, which is clearly and decidedly multilineate, as well as having other differential features.

We are provisionally considering Bolivar's *Plectoptera micans*,¹ described from material from the Cienaga de Zapata, Santa Clara Province, Cuba, to be based on the present species. The examination of authentic or topotypic material of *micans* may show our association to be incorrect, but at the present time no other course is open. No form of the genus but *porcellana* would at all answer the description of *micans*, but in a few features of the latter description we find discordance with our material. These, however, are probably due to the difficulty of exact description of the type of coloration of the tegmina found in *porcellana*. Bolivar, unfortunately, said nothing about the male genitalic features, if indeed he had that sex before him.

Aside from the locality of *micans* and the Cotorro record given above, the previously known exact records (Bayamo, Cayamas and Cristo) of *porcellana* are from Oriente Province in eastern Cuba.

The species has been recorded from Porto Rico by Gundlach² and from Mayaguez in the same island, by Rehn.³ The first reference in every probability refers to *dorsalis*, the only other Porto Rican species with the same type of variegated color pattern. The Mayaguez record refers to *rhabdota*, as the original material, now before us, demonstrates.

Gundlach states he took this species at Bayamo upon flowers, while *micans* he secured on the flowers of "Júcaro" in May. The available records indicate the presence of the species adult in February, March, May, October and December.

Rehn⁴ has supplied some useful notes on the color phases of this beautiful species. The punctulato-lineolate type which formed the basis of *krugi* Saussure and Zehntner is near the extreme recessive phase of the species, although in the most extreme condition, as represented by one Cayamas male, the pronotal disk is entirely rufescent, without the darker lateral blotches of the same area indicated in two specimens from the same locality. The disk is solidly fuscous in all the other specimens before us, although of variable depth, and in all of these and also in one having the center of the disk rufescent, the anal field of the tegmina is uniformly fuscous. We have seen no material of the extremely inten-

¹1888, Mem. Soc. Zool. France, I, p. 129.

²1887, Anales Soc. Españ. Hist. Nat., XVI, p. 143.

³1903, Trans. Amer. Entom. Soc., XXIX, p. 131.

⁴1909, Second Rep. Cent. Experm. Station, Rep. Cuba, p. 187.

sive phase of the species figured in colors by Saussure,¹ in which the tegmina, except for the marginal field, is solidly dark fuscous.

The styles of the subgenital plate of the male are more variable in this species than in the other West Indian forms. The differences are very difficult to describe and we are figuring styles of three Cayamas specimens to show the range of variation. The dextral style shows more tendency toward variation than the sinistral, which is always relatively short and broad. The dextral style varies in breadth as well as length, also in curvature of its surface, while both vary to some extent in the marginal spinulation. In character, however, the form of the styles is not liable to be confused with that of any species except *dorsalis*, and comparisons are here made under that species.

Plectoptera dorsalis (Burmeister)

Plates XXI, Figure 5; XXII, Figures 7, 13 and 14; XXIII, Figures 4 and 5

A[naplecta] dorsalis BURMEISTER, 1838, 'Hand. der Entom.,' II, abth. II, pt. 1, p. 494. Sex?; Porto Rico.

PORTO RICO.—Mayaguez, Department of Mayaguez, VI, 22, 1915, VII, 25, 1914, (Lutz and Mutchler; sweeping grass and weeds: H. G. Barber; beating about Experiment Station premises), 1 ♂, 2 ♀. Maricao, Department of Mayaguez, VII, 2, 1917, (Harold Morrison), 1 ♀, [U. S. N. M.]. Arecibo, Department of Arecibo, III, 1 to 4, 1915, VI, 24 to 26, 1915, (Lutz and Mutchler; beating coffee and bananas: Lutz; in flowers of *Ipomœa tilliasea*), 2 ♂. Cayey, Department of Guayama, V, 30 to 31, 1915, (Lutz and Mutchler; beating caladium, etc., in arroyo near town), 1 ♀. Aibonito, Department of Guayama, VI, 2, 1915, VII, 17, 1914, (H. G. Barber, Lutz and Mutchler; beaten from vegetation) 4 ♂, 3 ♀.

This species, which has not been clearly recognized since its description, is the Porto Rican member of the *porcellana* Group. The color pattern is essentially the same type as found in *porcellana*, the tegmina basically having a finely punctulate mosaic-like light and dark pattern. As a whole it is a generally paler insect than the Cuban *porcellana*, with the pronotal disk more rarely (the Mayaguez ♀) solidly fuscous in coloration, although six of the specimens from Mayaguez, Arecibo and Aibonito show lateral fuscous sections on the disk, separated by the ochraceous or ochraceous-orange shade seen to color the disk solidly in all the other specimens.

¹1870, Miss. Scient. Mex., Rech. Zool., VI, Pl. xxxi, fig. 50.

One male specimen from Arecibo and two (σ^7 and φ) from Aibonito have the anal field of the tegmina solidly and contrastingly fuscous, while another Aibonito female has marked traces of the same condition. The two Mayaguez females average darker than the specimens of both sexes from other localities, and more nearly approximate the uniformly dark type found in *porcellana*. Of the specimens with solid dark tegminal anal fields, none have solidly dark pronotal disks, one is of the uniformly pale ochraceous type and the others have lateral dark blotches on the pronotal disk. This demonstrates that these tendencies respond to different stimuli, and are probably independent and uncorrelated genetic features.

When compared with those of *P. porcellana* the styles of the male subgenital plate are more bulbous and less flattened, tapering to the distal apices, directed dorsad, and with the margin of the plate between the styles developed into an acute production. The apical section of the styles bears several spinulations. The sinistral style is more robust than the dextral, the latter being set in a more longitudinal plane. Reference should be made to the figures accompanying this paper for a clear understanding of the stylar form.

The species is known only from Porto Rico. Gundlach reported *P. porcellana*¹ from that island, which record evidently relates to the present insect. Gundlach states it lives under the loose bark of dead trees and at night enters houses, attracted by the light.

Plectoptera pygmæa (Beauvois)

Plates XXI, Figures 6 and 7; XXII, Figure 8; XXIII, Figure 6

Blatta pygmæa BEAUVOIS, 1805, 'Ins. Rec. Afr. et Amer.', p. 184, Orth., Pl. Ib, fig. 9. Sex?; St. Domingo.

HISPANIOLA.—San Francisco Mountains, Dominican Republic, IX, 15, 1905, (A. Busck), 1 σ^7 , [U. S. N. M.].

JAMAICA.—Stony Hill, St. Andrew Parish, X, 25, 1913, (M. Hebard; beaten from forest foliage), 1 σ^7 , [Hebard Cln.]. Near Troja, St. Catherine Parish, V, 15, 1904, (A. E. Wight), 1 σ^7 , [M. C. Z.]. Montego Bay, St. James Parish, III, 6, 1911, (J. A. Grossbeck; beaten from shrubbery), 1 φ .

¹1887, Anales Soc. Españ. Hist. Nat., XVI, p. 143.

The single specimen from Hispaniola has been dried from alcohol and in consequence its color pattern largely destroyed, the stylar genital features also much observed by distortion. There is no valid reason, however, for considering the material from the two islands as distinct, although the present is the only species known to occur in any two of the Antilles.

When compared with Beauvois' figure the Hispaniolan specimen agrees very well, after allowance is made for the antiquity of the figure. The texture of the lithographic stone, intentionally or otherwise, has imitated with fair fidelity the pattern of our Hispaniolan male. The pronotal disk is pale in the latter specimen, while in the Jamaican individuals it is solidly cinnamon-brown in one, with the center of the disk ochraceous, flanked laterad with cinnamon-brown, in another, and similar to the latter condition but with no pale marginal bordering in the Troja male. The anal field of the tegmina shows no infuscation in the Hispaniolan male, in the Stony Hill male there is but a small dark area at the apex of the field, while the Troja male has this area somewhat larger. The Montego Bay female, however, has the anal field with its distal half solidly cinnamon-brown.

The styles of the males examined show some differences, but we feel they furnish no valid reason why the specimens should not be referred to the same species. The San Francisco Mountains specimen has the dextral style somewhat shrivelled and distorted, so that it is exceedingly difficult to compare it satisfactorily with that from Stony Hill. In consequence we are figuring solely the Jamaican male, and an examination of this illustration (Plate XXIII, fig. 6) will show the stylar features better than a description. The sinistral style is somewhat thicker and heavier in the latter than in the Hispaniolan specimen, and the inter-stylar section of the margin of the subgenital plate has the median lobulation narrower in the San Francisco Mountains male than in the one from Stony Hill. These differences, however, are less than we find as individual variations in *P. porcellana*, and until we can examine more and perfect Hispaniolan material we prefer to refer the material from the two islands to the same species. Beauvois states the species occurs in forest, and the junior author secured it by beating foliage of the relatively dense forest at Stony Hill, Jamaica.

Plectoptera rhabdota,¹ new species²

Plates XXI, Figures 8 and 9; XXII, Figure 9; XXIII, Figure 7

A species characterized by possessing a marked pale lineolate pattern on proximal two-fifths of tegmina, distad of which the pattern is made up of closely placed but irregularly shaped vermiculations; a dark line between the eyes is bordered ventrad by a line of whitish. The nearest relatives is *P. perscita*, described and compared below. The styles of the male subgenital plate are distinctive in shape, for details of which the student is referred to the accompanying figures.

TYPE.—Male; San Juan, Department of San Juan, Porto Rico. July 11, 1914. (H. G. Barber; sweeping over mixed vegetation.) [New York Academy of Sciences; American Museum of Natural History.]

Size moderately small (for genus); form of usual convex type, but somewhat more deplanate than in *P. porcellana*; surface polished, shining.

Head visible cephalad of pronotum for nearly its entire width; in form trigonal, greatest width across eyes slightly surpassing greatest depth of head; occipital outline very faintly convex; interspace between eyes broad, at narrowest point but slightly less than that between antennal scrobes; eyes appreciably prominent, strongly arcuate reniform when seen in cephalic aspect.

Pronotum transverse elliptical, with a sub-hexagonal tendency, due to lateral margins being sub-obtuse-angulate; greatest length of pronotum contained about twice in greatest width of same; cephalic margin of pronotum very faintly convex, passing rather narrowly to the sub-obtuse-angulate lateral margins, which in turn pass by a rounded obtuse angle into the distinctly angulate caudal margin: in transverse section the pronotum is distinctly arcuate, more strongly decurved laterad.

Tegmina very narrowly surpassing apex of abdomen, the two when in repose and seen from dorsum elliptical in outline; their individual width contained about two and one-half times in greatest length of same; apices of tegmina narrowly rounded acute-angulate: marginal field relatively narrow, sharply defined; anal field indicated by venational color pattern, elongate pyriform: venation, as evidenced by color pattern, having discoidal and ulnar veins subparallel, former with seven to eight well-spaced rami diverging toward costal margin; ulnar vein with four rami obliquely diverging toward sutural margin; axillary veins six to seven in number.

Subgenital plate of male with interstyler portion of margin with an acute, conical, linguiform production, approximately half as long as styles: styles relatively short, robust plates, their length but little greater than their width, with ventral surface impressed, internal margins arcuate distad, so that their broad apices appear to diverge, distal section of styles with sparse chætiform hairs, details of the styles are shown in Plate XXIII, figure 7. Cerci relatively short, fusiform, moderately depressed.

¹I. e., *παθδωρῆ*, striped.

²This species is in all probability that reported by Gundlach (1887, *Anales Soc. Españ. Hist. Nat.*, XVI, p. 143) from Porto Rico, as *krugii* Saussure and Zehntner did not describe *krugii* until 1893 and the name was applied by them to Cuban material. Saussure doubtless examined material for Gundlach and supplied him with the manuscript name. The present species bears a considerable superficial resemblance to that phase of the Cuban *P. porcellana* to which we consider the name *krugii* was applied, Rehn (1903, *Trans. Amer. Entom. Soc.*, XXIX, p. 131) recorded the present species from Mayaguez, Porto Rico as *porcellana*.

Cephalic femora with ventro-cephalic margin bearing a series of minute, short, chætiform hairs, ventral margins of median and caudal femora supplied only with scattered elongate chætiform hairs. Tarsal claws unequal, the more elongate one with flexor margin bearing five denticulations, arolia relatively large.

ALLOTYPE.—Female; Aibonito, Department of Guayama, Porto Rico. July 14 to 17, 1914. (H. G. Barber.) [New York Academy of Sciences; American Museum of Natural History.]

Differing from the above description of the male in the following features:

Interspace between eyes very broad, equal to that between antennal scrobes. Subgenital plate broad, transverse, distal margin arcuato-truncate.

General base color of pronotal disk and discoidal and anal fields of tegmina ranging from yellow-ochre through raw sienna to argus brown; lateral portion of pronotum, narrow cephalic and caudal margins of same and marginal field of tegmina clear hyaline to washed partially or completely with opaque whitish. Pronotal disk in about one-half of specimens with paired lateral areas darker than pale central section, darker, quite solid and extensive in some individuals, weaker and more nebulous in others, no indications of dark areas in a few. Venation of discoidal and anal fields of tegmina completely pencilled in opaque cream-color, areas between the veins and their rami in distal three-fifths filled by a complicated and minutely vermiculate pattern of the same color, the elements of which have as a whole tendency of disposition paralleling the veins, anal field with interaxillary punctulato-lineations. Head of the same general color as the pronotal disk, more specifically of the median section of same; interocular bar opaque creamy white, relatively broad, relieved along dorsal margin by a slight darkening of general color of head; eyes blackish fuscous. Venter of thorax and abdomen ranging from light ochraceous-buff to mummy brown, in direct ratio to depth of dorsal color tone, on abdomen frequently with broad paler lateral borders, which occasionally in very recessive individuals (type) also completely encompass the distal margins of the sternites. Cerci always pale; subgenital plate of female with intercercal section of margin broadly pale margined. Limbs, distal section of coxæ, palpi and antennæ light ochraceous-buff to ochraceous-buff.

The uniformly pale pronotal disk is not always associated with a pale base color of the tegmina, although generally so, the relatively dark Jayuya female having a solidly pale disk. The paler limb color is also not always correlated with a general lightening of color tones. The opaque lineation of the terminal venation is always indicated, although more apparent in the individuals of pale or moderately dark coloration.

Male (type).—Length of body, 5.12 mm.; length of pronotum, 1; greatest width of pronotum, 1.93; length of tegmen, 4.11.

Female (allotype).—Length of body, 5 mm.; length of pronotum, 9.2; greatest width of pronotum, 1.8; length of tegmen, 4.45.

In addition to the type and allotype the following material, all of which may be considered paratypic, is before us.

San Juan, Department of San Juan, Porto Rico, VII, 11, 1914, (H. G. Barber; sweeping over mixed vegetation), 1 ♂: VI, 24, 1917, (Harold Morrison), 1 ♀, [U. S. N. M.].

Vega Alta, Department of San Juan, Porto Rico, II, 21, 1917, (on grape-fruit tree), 1 ♂, [Porto Rico Dept. Agr.].

Rio Piedras, Department of Humacao, Porto Rico, VI, 22, 1906, (H. G. Smyth; on guava (*Psidium guayava*), 1 ♀, [Porto Rico Dept. Agr.].

Jayuya, Department of Arecibo, Porto Rico, I, 6, 1915, (H. E. Crampton; bushes and shrubs), 1 ♀.

Arecibo, Department of Arecibo, Porto Rico, VI, 24 to 26, 1917, (A. G. Mutchler), 1 ♀ (abdomen missing).

Mayaguez, Department of Mayaguez, Porto Rico, I, 1899, (A. Busck), 1 ♂, [U. S. N. M.]: IV, 26, 1912, (C. W. Hooker), 1 ♀, [U. S. N. M.].

Lares, Department of Aguadilla, Porto Rico, IV, 16, 1922, (F. Sefn; in nest of larvæ of *Tetralopha scabradella*), 1 specimen, apex of abdomen missing, [Porto Rico Dept. Agr.].

Aibonito, Department of Guayama, Porto Rico, VII, 14 to 17, 1914, (H. G. Barber), 1 ♂, 1 ♀.

St. Thomas, Virgin Islands, VI, 5, 1917, (Harold Morrison), 1 ♂, [U. S. N. M.].

Swept Magen Bay, St. Thomas, Virgin Islands, VI, 3, 1917, (Harold Morrison), 1 ♂, [U. S. N. M.].

These specimens show no features of individual variation other than those noted above under coloration. The species is, apparently, one of fairly wide distribution in Porto Rico, possible occurring as well in all of the larger members of the Virgin group.

Plectoptera perscita,² new species

Plates XXII, Figures 1 and 10; XXIII, Figure 8

Plectoptera poeyi CAUDELL, 1914, (not of Saussure), Proc. U. S. Nat. Mus., XLVII, p. 491. ♀; Dominica.³

A member of the same species group as the Porto Rican *P. rhabdota*, described above, possessing the same elements in its color pattern, but differing chiefly in the more strongly transverse head, the tegminal color pattern having many irregular and broken transverse intervenous pale lineolations, also marked infuscation of the distal sections of the costal veins of the tegmina; the styles of the male subgenital plate are very distinctive, being larger than in any other West Indian species known to us, the sinistral one also embracing the dextral. For the form of the

¹This is the specimen reported by Rehn (1903, Trans. Amer. Ent. Soc., XXIX, p. 131) as *P. porcellana*.

²I. e., very pretty.

³Since preparing the accompanying description of *perscita* we have been able to examine the single female from Dominica, bearing the data "June-July, H. W. Foote, Yale Exp. 1913," which was recorded by Caudell as *poeyi*. It is dismembered, in a Riker mount, and as far as can be told from the sex, and a specimen in that condition, is the present species. It is clearly not *poeyi*, nor *dominicæ*, here described, and it has the characteristic pattern of *perscita* indicated, although more weakly than in the type.

styles the student is referred to fig. 8 on plate XXIII. While the type is unique and thus we are not able to judge definitely whether the features of the pattern mentioned above are not subject to variation, we assume, from analogy in *P. rhabdota*, that the opaque whitish features are less liable to variation than tonal depth. The form of the styles, however, will immediately distinguish the males of the two species.

TYPE.—Male; Laudet, Dominica. June 11, 1911. (F. E. Lutz; beaten from moss-covered lime trees.) [American Museum of Natural History.]

Size moderately small (for genus); form as usual in genus; surface polished and shining.

Head visible cephalad of pronotum for almost its entire width; in form trigonal, appreciably transverse, greatest width across eyes equal to one and one-half times greatest depth of head; occipital outline very faintly convex, interspace between eyes but slightly less than that between antennal scrobes, and subequal to two-fifths of greatest width of head; eyes quite prominent, very strongly reniform arcuate as seen from cephalic aspect.

Pronotum of same type as *P. rhabdota*.

Tegmina surpassing apex of abdomen by nearly length of pronotum, the two when in repose and seen from dorsum elongate elliptical, their individual width contained three times in greatest length of same; apices of tegmina well rounded acute angulate; anal field, as indicated by pattern, elongate pyriform: venation of same general type and indication as in *P. rhabdota*; discoidal vein with six to seven rami toward costal margin; ulnar vein with five rami obliquely diverging toward sutural margin; axillary veins five to six in number.

Subgenital plate moderately produced mesad, deeply and strongly arcuate emarginate at the insertion of the styles: styles large, deplanate, set obliquely, sinistral embracing considerable of the dextral; sinistral style subconical in outline or with apex rectangulate, distal section appreciably bent over the adjacent portion of the dextral one, distal margin with two and internal margin with one pronounced, erect spines and adjacent ventral surface with a number of chaetiform hairs; dextral style in outline less trigonal than sinistral, distal and disto-lateral margin regularly arcuate, internal margin nearly straight, distal margin with two erect teeth and scattered chaetiform hairs.

Femora with ventral margins as in *P. rhabdota*. Tarsal claws and arolia as in *P. rhabdota*, but former with finer denticulations.

General color light ochraceous-buff, the overlying pattern being cinnamon-brown. Head with a broad interocular bar of cinnamon-brown, face with three blotches of the same color arranged arcuately in a transverse fashion, dorsad of this is a pair of small dots of the same color; eyes fuscous; antennæ of general color with segments narrowly banded distad with cinnamon-brown, this more evident distad, very weakly so proximad. Pronotum with disk bearing a pair of lateral blotches of cinnamon-brown, separated by an interval wider than a single blotch and light ochraceous-buff in color; lateral sections of pronotum nearly clear hyaline,¹ narrow cephalic and caudal margins weakly creamy white opaque. Tegmina with discoidal and anal fields nearly solidly cinnamon-brown as a base color, this weaker in the scapular region, the linea-

¹Possibly these areas were more opaque in life.

tion of the venation decided and of the general color, the axillary and costal veins, and the rami of the ulnar veins, as well as the ulnar vein itself, with many lateral venules pencilled for some distance from the basic nervure, this producing a markedly hatched pattern, augmented by intervenal lineations and irregular vermiculations; costal veins with the vicinity of their distal portions appreciably infuscated: marginal field of the general base color, unmarked. Venter largely buckthorn brown, clouded on pleura and coxæ, as well as on disk of abdomen, with cinnamon-brown. Limbs of general color; tibiæ with vicinity of insertion of spines, particularly of extensor surface, marked with cinnamon-brown.

Length of body, 5.62 mm.; length of pronotum, 1.09; greatest width of pronotum, 2.01; length of tegmina, 4.78.

The type of this beautiful and most interesting form is unique. Whether the species will be found in other islands of the Lesser Antilles remains to be determined.

***Plectoptera vermiculata*,¹ new species²**

Plates XXII, Figures 2 and 11; XXIII, Figure 9

Plectoptera poeyi REHN, 1909, Sec. Rep. Cent. Exper. Sta. Rep. Cuba, p. 186 Cayamas, Cuba. (In part.)

This species is a close relation of *P. lacerna*, described below, the two comprising a group so far as known restricted in distribution to Cuba. The color pattern of the group consists on the discoidal and anal fields of the tegmina of a mosaic pattern coarser and fainter than found in the *Porcellana* Group, the pronotal disk never dark and the anal field of the tegmina never solidly infuscate. The tegminal pattern has no indication of the lineolate pattern so evident in the *Rhabdota* Group. Certain of the material of the present species has little or no indication of the tegminal pattern, but from the condition of the specimens this appears to be due to the method used in their preservation. The differences between *vermiculata* and *lacerna* are given under the latter species.

TYPE.—Male; Cayamas, Oriente Province. Cuba. March 13. (E. A. Schwarz.) [United States National Museum.]

Size medium small (for genus); form as usual in genus; surface markedly polished.

Head evident cephalad of pronotum for virtually its entire width; in facial view head outline is trigonal, faintly broader than deep; occipital outline very faintly convex, interspace between eyes faintly greater than one-third of entire width of head: eyes moderately prominent but strongly arcuate in outline, their general form, seen from venter, strongly arcuato-reniform.

¹I. e., inlaid like a mosaic, in allusion to the very delicate tegminal pattern of this species.

²The queried Cuban record by Saussure and Zehntner (1893, 'Biol. Cent.-Amer., Orth.', I, p. 84), of *unicolor* Burmeister, a species described from Colombia and which can hardly be satisfactorily placed generically until the type has been examined, probably relates either to this species or *lacerna*, described below.

Pronotum transverse elliptical, greatest length contained one and five-sixth times in greatest width of same; cephalic and caudal margins distinctly but not strongly convex, the latter slightly more arcuate than former, both passing into lateral margins without really appreciable angles; lateral margins rounded subobtusely angulate; in transverse section regularly arcuate.

Tegmina very slightly surpassing apex of abdomen, the two together (with pronotum) in repose sub-elliptical: character of fields and vein disposition as usual in genus, except that anal field is relatively more narrowly elongate than in *Porcellana* Group; costal veins nine in number, regularly disposed; ulnar rami toward sutural margin not as clearly evident as costal veins; ulnar sulcus, as indicated by pattern, straight oblique in distal three-fourths.

Subgenital plate faintly asymmetrical, medio-distal emargination decided, concave: styles inflated, bulbous, sinistral appreciably larger than dextral, each with a single distal spine; between stylar bases is situated an aciculate spiniform structure, slightly more than half as long as styles. Cerci simple, rather broad in form, apices sharply acute.

Tarsi with claws strongly asymmetrical, caudal claw much larger compared with very short cephalic claw, its internal margin with a distinct proximal shoulder and two marginal teeth; arolia relatively very large.

ALLOTYPE.—Female; Cayamas, Oriente Province, Cuba. June 6. (E. A. Schwarz.) [United States National Museum.]

Differing from the above description of the male in the following features. Interspace between eyes equal to half entire width of head. Pronotum faintly more transverse, greatest length contained about twice in greatest width of same. Wing, detached and spread in allotype, of the same character and with same venational and areal distribution as *P. porcellana*, except that appendicular field is narrower and faintly shorter, its length being slightly less than that of major portion of wing, while its apex is sharper and its margins less arcuate. Subgenital plate very ample, transverse, its distal margin weakly convex between the cerci.

General color of pronotal disk light ochraceous-buff; base color of anal and discoidal fields of tegmina ochraceous-tawny with an overlying, anastomosing neurational pattern of light ochraceous-buff; lateral portions of pronotum and marginal field of tegmina nearly hyaline pale ochraceous-buff. Head pale ochraceous-tawny, with a broad, interocular line of opaque whitish, bordered dorsad by a delicate but not sharply indicated pencilling of tawny; lower face with a transverse figure of opaque creamy white, occasionally divided mesad; antennæ ochraceous-buff with a touch of salmon; eyes cinnamon-brown. Pronotum with intimations of paired areas of tawny on disk. Tegminal pattern cribose, meshed, not punctulate as in the *Porcellana* Group, the areolæ between the veins and rami filled with pale lines, generally anastomosing. Pleura of venter russet; coxæ and limbs light ochraceous-buff; venter of abdomen russet to deep mars brown, sometimes (as in male type) almost completely overlaid with a dense opaque frosting of whitish, the base color of this surface showing through obscurely along the median line and sharply in paired lateral subtrigonal spots, set a distance inside of the lateral margins; or with a broad lateral margin of the segments, a narrower distal margin of the subgenital plate and also of the distal margins of the distal abdominal segments (as in allotype). Cerci tawny to deep mars brown, pale-edged and tipped.

MEASUREMENTS

	Length of Body	Length of Pronotum	Width of Pronotum	Length of Tegmen
♂, Cayamas, Cuba, type.....	6.63	1.09	2.10	4.87 mm.
♂, Cayamas, Cuba, paratype.....	5.62	1.12	2.01	5.04
♂, Twelve and one-half kilometers south of Pinar del Rio, Cuba....	5.12	1.04	1.97	4.53
♀, Cayamas, Cuba, allotype.....	4.45	1	2.18	4.36
♀, Cayamas, Cuba, paratype.....	5.46	1.09	2.01	4.87
♀, Twelve and one-half kilometers south of Pinar del Rio, Cuba....	4.36	1.17	2.10	4.45

In addition to the type and allotype we have before us the following material.

Cayamas, Oriente Province, Cuba, May 7 and June 6, (E. A. Schwarz), 2 ♂, 1 ♀, *paratypes*, [United States National Museum].

Twelve and one-half kilometers south of Pinar del Rio, Pinar del Rio Province, Cuba, September 12 to 23, 1913, (F. E. Lutz and C. W. Leng; beaten from pine in pine-palmetto region), 4 ♂, 1 ♀.

We have considered solely the Cayamas specimens as paratypic, as certain differences in the other material are noticeable. All agree, however, in the fundamental genitalic features, and we have every reason to feel but a single species is represented. The chief difference noted is that the specimens from south of Pinar del Rio lack the markedly mosaic pattern of the tegmina of Cayamas individuals, and in general these members are nearly hyaline pale tawny. In certain lights, however, traces of the mosaic pattern can be seen, and we feel that the method of killing or preserving this material may have altered the pattern, particularly as the general decoloration has in several of them rendered subobsolete the striking opaque whitish of the interocular region and the ventral abdominal surface, also diluted the base color of the pleura and venter of the abdomen. The cerci are sometimes entirely pale, and the whole series shows considerable variation in the extent of the whitish overlay on the marginal bordering of the abdominal sternites.

***Plectoptera lacerna*,¹ new species²**

Plates XXII, Figures 3 and 12; Figure XXIII, Figure 10

A close relative of *P. vermiculata*, described above, and like it a Cuban insect, but differing chiefly in the form of the styles of the male

¹ i. e., a mantle, in allusion to the appendicular field of the wing in this genus.

² See footnote 2, page 309, relative to the record of *P. unicolor* Burmeister from Cuba, by Saussure and Zehntner, which may refer to this species.

subgenital plate, these being compressed and claw-like, quite different from the inflated type found in *P. vermiculata*. The color pattern of the venter of the abdomen and a sprinkling of appreciable brown dots on the tegmina are distinctly different from the conditions found in *P. vermiculata*.

TYPE.—Male; Merceditas, fourteen kilometers north of Viñales, Pinar del Rio Province, Cuba. September 20, 1913. (F. E. Lutz; swept from grasses, sedges, etc., about a water hole.). [American Museum of Natural History.]

Size small (even for genus); form elongate elliptical; surface shining.

Head visible cephalad of pronotum for virtually its entire width; when seen in facial aspect depressed trigonal, greatest width of head across eyes appreciably greater than greatest depth of head; interocular occipital outline nearly straight truncate, interspace between eyes equal to but slightly less than half entire width of head; outline of eyes strongly arcuate, moderately prominent, general form of eyes when seen from face reniform arcuate.

Pronotum transverse elliptical, greatest length contained approximately one and two-thirds times in greatest width of same, of the general type found in *P. vermiculata*.

Tegmina as described as *P. vermiculata*.

Subgenital plate weakly asymmetrical, dextral section of margin with emargination more decided and concave than of sinistral portion of margin, medio-distal section of margin briefly convex: styles compressed, subvertical in position, unguiculate, particularly dextral, latter more compressed than sinistral which is shorter and more bluntly rounded at apex, dextral aciculate at apex; internal surface of subgenital plate between styles with a recurved, caudad directed spiniform process.

Tarsal claws and arolia much as in *P. vermiculata*.

General color of the head and pronotal disk light ochraceous-buff to ochraceous-buff, passing to weak buckthorn brown on the discoidal and anal fields of the tegmina. Head with occiput washed with ochraceous-tawny, finely pencilled interocular line opaque whitish; antennæ and palpi of general color; eyes mars brown. Pronotal disk occasionally (*paratype*) with periphery of disk laterad and caudad broadly but not very deeply tinted with cinnamon-brown; lateral portions of pronotum and marginal field of tegmina pale yellowish hyaline. Pattern of tegmina caused by a pencilling of the venation, more particularly the principal veins, with hyaline light ochraceous-buff, the areòlets buckthorn brown of variable depth and strength, thus affording the color contrast which emphasizes the pattern; in addition there is a regularly distributed but well-spaced pattern of small but marked dots of mars brown, which are situated chiefly on or very near the discoidal, costal and ulnar veins, those on the costal placed regularly one on each vein at equal distance from costal margin; vicinity of apex of anal sulcus weakly infuscate with mars brown. Limbs ochraceous-buff. Venter of abdomen with disk tawny, narrowly russet to mars brown in contact with lateral opaque white fasciæ, placed at a uniform distance from the lateral margins, the section between the fasciæ themselves and the margins pale ochraceous-tawny to pale mars brown; subgenital plate without white.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♂, Merceditas, fourteen kilometers north of Viñales, Cuba, type. . . .	4.78	1	1.76	4.2 mm.
♂, Cerro Cabras, Cuba, paratype. .	5.29	1.09	1.59	4.03

In addition to the type of this interesting species we have before us a single paratype male, taken at Cerro Cabras, near Pinar del Rio, Pinar del Rio Province, Cuba, September 11, 1913, by F. E. Lutz (sweeping grass pines and oak), and from the American Museum collection. This specimen has been considerably damaged but is perfectly typical of the species, its measurements being given above. Its coloration is somewhat more intensive than that of the type, as evidenced by the above color description.

Plectoptera poeyi (Saussure)¹

Bl[atta] poeyi SAUSSURE, 1862, Rev. et Mag. de Zool., (2) XIV, p. 164. ♂; Cuba.

Plectoptera floridana HEBARD, 1917, Mem. Amer. Entom. Soc., No. 2, pp. 16, 251, Pl. x, figs. 9-12. ♂, ♀; Big Pine Key and Key West (type locality), Florida.

CUBA.—Güines, Havana Province, III, 29, 1903, (A. E. Schwarz), 1 ♀, [A. N. S. P.].

The junior author's description of *P. floridana* was due to a misconception of *poeyi* of Saussure. The material at that time referred to *poeyi*, as we now know, was composite, and the males used for comparison were *P. vermiculata*, here described, which from features of its coloration we are now convinced could not be the true *poeyi*. The latter species is said to have the "vertice linea tenui perfusca; abdomine rufescente margine et segmentorum limbo albido," which features are not, in an exact sense, those of *vermiculata*, but are of *poeyi* as here understood. Again the tegmina of *poeyi* are, by inference, unmarked and "pallide testacea," which is not true of properly preserved *P. vermiculata*. The important genital features were, of course, not men-

¹The senior author's record of *poeyi* from Cayamas, Cuba (1909, Second Rep. Cent. Exper. Sta. Rep. Cuba, p. 186), is in part this species and in part *vermiculata*. The Havana record in the same paper is probably correct, but the material cannot be located for reexamination. The specimen from Vieques Island recorded as *poeyi* by Rehn (1903, Trans. Amer. Entom. Soc. XXIX, p. 131) we are unable to locate, so its position in the light of present day knowledge cannot be determined. It probably, however, represents *P. infulata* described below. Caudell's record of *poeyi* from Dominica (1914, Proc. U. S. Nat. Mus., XLVII, p. 491) we now know refers to *P. perscita*, which see (page 307).

tioned by Saussure. But a single male of *poeyi* from Cuba is now before us, and this may not have been examined when *floridana* was described, while quite a few males of *vermiculata* were available. The description and figures of *floridana* given by Hebard (vide supra) precludes the necessity of a redescription of this species. The male before us has the coloration of the ventral surface of the abdomen exactly as described by Saussure.

The species is definitely known only from extreme southern Florida (i. e., the Keys and the mainland at Cocoanut Grove), and the island of Cuba. For comments on records from elsewhere see footnote 1 on page 307, page 309 and footnote, on page 313, as well as below. We are unable to offer any explanation for the occurrence of this species in Florida except to affirm our belief that its presence there is in no way due to the influence of man. *Poeyi* in Florida is a species of strictly unaltered natural conditions and not of those areas which have been disturbed by human agencies. The information available shows it occurs adult, in Florida at least, from January to early July. We know nothing of its habits in Cuba, but on the Florida Keys it frequents dry scrubby vegetation, particularly *Ilex cassine*.

Plectoptera infulata,¹ new species²

Plate XXIII, Figure 11

This species needs comparison solely with *P. poeyi* and *dominicæ*, which are its nearest relations. Like these, *infulata* possesses uniformly colored tegmina and the pronotal disk is not decidedly contrasted with the coloration of the tegmina. From *poeyi* the present species can be distinguished by the much greater interocular space in both sexes; which also has a whitish transverse line as conspicuous as the more dorsal dark line, and by the different subgenital plate of the male, which has very distinctive enlarged styles (see Pl. XXIII, fig. 11), in no way resembling those of *P. poeyi*.

TYPE.—Male; Mayaguez, Department of Mayaguez, Porto Rico. July 28, 1914. (H. G. Barber; in grounds of Experiment Station.) [New York Academy of Sciences; American Museum of Natural History.]

Size medium (for genus); form elongate elliptical, dorsal surface convex as usual in genus; surface moderately polished and shining.

¹I. e., wearing the infula or head-band, in allusion to the interocular color band found in species of the genus.

²The record of *P. poeyi* from Vieques Island, (Rehn, 1903, Trans. Amer. Ent. Soc., XXIX, p. 131) may refer to this species. There seems every probability the material then examined does not belong to the Cuban and Floridian *poeyi*. The specimen cannot be located at this writing, so the exact disposition of the record must await future study. Gundlach recorded *P. unicolor* Burmeister, a Colombian insect of uncertain relationship, from Porto Rico. There seems every probability this refers to *infulata*, the only uniformly colored member of the genus known from that island.

Head narrowly visible cephalad of pronotum for almost its entire width: seen in facial aspect head outline is subtrigonal, greatest width across eyes about one-fourth more than greatest depth of head; occipital outline in same view subtruncate; interspace between eyes very broad (for male sex), equal to but faintly less than one-half of greatest width of head: eyes moderately prominent, arcuate reniform in outline.

Pronotum strongly transverse elliptical, its greatest width slightly more than twice the greatest length of same; cephalic and caudal margins very broad arcuate, passing by a well-rounded obtuse angle (caudad) or without an appreciable angle (cephalad) into the convex lateral sections of the margins, which show in their middle an extremely faint angulate tendency; in transverse section the pronotum is decidedly convex, with lateral portions more sharply declivent.

Tegmina of the type usual in the genus, slightly surpassing apex of abdomen, with vein definition as in *P. poeyi*.

Subgenital plate slightly asymmetrical but general features of its margin are balanced; laterad of styles are distinct infra-cercal concave emarginations; mesad the margin is developed into a broad linguiform projection shorter than the styles, which is arcuate distad and there supplied with hooked spinulations: styles relatively short and broad, basal width subequal to length, somewhat inflated on ventral surface, ventrad and distad with a few erect spinulations; dextral style slightly smaller and more narrowed proximad than sinistral. Tarsal claws unequal, ventral margin serrulate: arolia large.

ALLOTYPE.—Female; Aibonito, Department of Guayama, Porto Rico. . July 17, 1914. (H. G. Barber; beating.) [New York Academy of Sciences; American Museum of Natural History.]

Differing from the description of type in following noteworthy features.

Interspace between eyes extremely broad, equal to approximately five-eighths of greatest width of head. Subgenital plate large, transverse; distal margin equal to three-fourths of greatest width of plate, transversely truncate.

General color of dorsal surface ranging from mustard yellow (type) to yellowish citrine, lateral sections of pronotum and marginal field of tegmina nearly clear hyaline. Ventral color ranging from pale tawny with abdominal sternites largely clouded with pale ochraceous-buff (type) to cinnamon-brown with abdominal sternites and subgenital plate very broadly margined laterad and distad with pale ochraceous-buff. This latter coloration is that of most of the females, but one from Cayey is more as described for the type. Interocular bar double, above finely lineate with tawny (type) to cinnamon-brown, below, and in contact with darker band, with a broader band of pale ochraceous-buff, this weaker in the type than in the other specimens: eyes cinnamon-brown to prout's brown. Limbs (including coxæ) light ochraceous-buff to ochraceous-buff.

MEASUREMENTS

	Length of Body	Length of Pronotum	Greatest Width of Pronotum	Length of Tegmen
♂, Mayaguez, Porto Rico, type...	5.29	1.3	2.1	4.95 mm.
♂, Aibonito, Porto Rico, allotype..	5.54	1.26	2.18	5.04
♂, Cayey, Porto Rico, paratype...	5.46	1.17	2.1	4.87
♂, Cayey, Porto Rico, paratype...	5.12	1.34	2.22	5.2

In addition to the type and allotype we have before us the following material.

Aibonito, Department of Guayama, Porto Rico, July 15 to 16, 1914, (H. G. Barber), 1 ♂, 1 ♀, paratypes.

Cayey, Department of Guayama, Porto Rico, May 30 to 31, 1915, (Lutz and Mutchler; beating caladium, etc., in arroyo near town), 3 ♀, paratypes.

Rio Piedras, Department of Humacao, Porto Rico, May 20, 1923, (G. N. Wolcott; at light), 1 ♀, paratype, [A. N. S. P.].

These specimens show no important differences except in the color tone, which has been discussed in the color description. It may be summarized as a yellow extreme tone on one hand and an olive-greenish tendency on the other. One female from Cayey has an oötheca partially protruding from the body, this being carried with the carina dorsad, the latter crenulato-dentate in profile.

Plectoptera dominicæ, new species

Plate XXIII, Figures 12 and 13

A very distinct species of the genus, having a simple type of styles of the subgenital plate of the male, such as is found in no other species of the genus we have examined. It is a member of the pale section, typified by *poeyi*, but its generalized subgenital plate and styles will readily differentiate it from *poeyi* and *infulata*.

TYPE.—Male; Laudet, Dominica. June 11, 1911. (F. E. Lutz; beaten from moss-covered lime trees.) [American Museum of Natural History.]

Size median (for the genus); form elongate elliptical, moderately convex dorsad; surface moderately shining.

Head visible cephalad of pronotum for nearly its entire width; in facial aspect head is seen to be trigonal in outline, its greatest width very faintly greater than the depth of the head; occipital outline arcuato-truncate; interspace between eyes slightly greater than one-third of greatest width of head; eyes moderately prominent, narrow when seen in cephalic aspect, strongly arcuate-reniform in outline.

Pronotum of the form usual in the genus, transverse subelliptical, greatest length contained nearly twice in greatest width of same; cephalic margin subtruncate, caudal margin moderately arcuate, both passing into lateral margins by well-rounded but evident angles; lateral margins distinctly obtuse-angulate, cephalic section of these margins arcuate, caudal sections straight oblique; in transverse section pronotum is convex with lateral section distinctly declivent.

Tegmina of type usual in genus, surpassing apex of abdomen by slightly less than one-half of length of pronotum; venation as in related species.

Subgenital plate weakly asymmetrical, distal margin moderately produced mesad, lateral sections of margin appreciably concave, median section subtruncate: styles short, simple, apices rounded; dextral style more evident from venter, inserted in

marked socket on ventral surface; sinistral style placed on dorsal surface of plate, its exact form more difficult to determine than dextral one. Cerci subfusiform, quite attenuate distad, subdepressed.

Tarsal claws unequal, ventral margin serrulate, Arolia large.

General color of dorsum pale ochraceous-orange, lateral sections of pronotum and marginal field of tegmina clear hyaline. General color of venter pale ochraceous-tawny, paling to light ochraceous-buff on the disk of the pronotum and to antimony yellow on the limbs and antennæ. Faint interocular line light ochraceous-buff; eyes mummy brown.

Length of body, 5.88 mm.; length of pronotum, 1.51; greatest width of pronotum, 2.39; length of tegmen, 5.46.

The type of this most interesting species is unique.

Perisphaerinae

At least three members of this subfamily are known from the West Indies, representing possibly two genera. Eleven recognized genera have been referred to this assemblage from tropical America, but our knowledge of the relationship of some of them is very unsatisfactory. Certain of the species found in the American tropics are known to be bromeliadiculous. The subfamily is highly developed in the Ethiopian Region, and many species there and in tropical America are greatly modified in structure, with very marked sexual dimorphism.

Two of the species described from the West Indies are referable to the genus *Poroblatta* Hebard, originally described from Colombia. The third species, described from Jamaica by Walker, as *Polyzosteria panesthoides*,¹ is one of the few West Indian species we are unable to place to our satisfaction. Uvarov has very kindly examined Walker's type in the British Museum of Natural History and his comments are as follows:

"*Polyzosteria panesthoides* type is adult ♀; there is no reason to doubt the locality (Jamaica), and as far as I was able to find out it belongs somewhere near *Hormetica*, has the elytra rudimentary like in *Parahormetica* and well developed pulvilli (i. e., arolia) between claws."

The main features of Walker's description we are giving below,² in the hope that someone may be able to aid in definitely placing the species.

¹1868, 'Catal. Blatt. Brit. Mus., p. 164.

²*Panesthoides* is said to be 17 lines (approximately 34 millimeters) long, tawny, with a large discoidal black patch on the pronotum, which spot is much excavated caudad. The antennæ are described as black, tawny at their bases, toward the apices with a broad testaceous band. The meso- and metathorax are said to have a few black spots and transverse black streaks. The abdomen is black, tawny bordered; underside tawny, darker towards the tip and with blackish patches on each side. Cerci black. Legs short and thick. Wings rudimentary, covering sides of the mesothorax and of the metathorax. Fore wings black, very minutely punctured, tawny towards the free border and along part of the hind border.

Kirby,¹ who examined the type, placed the species in the genus *Blaptica* of the Blaberinæ, a position almost inconceivable if the specimen actually came from Jamaica.

We have seen nothing resembling this insect from the West Indies, and as far as we can ascertain it is probably a species of *Hormetica* or a related genus. The tegminal form suggests *Parahormetica*, while the arolar feature is that supposed to be characteristic of *Hormetica*, which is also suggested by the pronotal and abdominal coloration. However, as we now know that immature individuals of *Hormetica* lack arolia, this single character in the case is of less value as a generic feature. After mature consideration it seems best merely to call attention to the species under the subfamily and attempt no generic association, which to a considerable extent would be guess-work, leaving to the future, when our information is more complete, definite assignment of *panesthoides*. The possibility of the locality being erroneous must also be considered.

POROBLATTA Hebard

This genus was erected² for two species from Colombia, *P. cylindrica* and *apatela* Hebard, known solely from females. The West Indian species here referred to *Poroblatta* are so assigned with a full realization that this action is purely tentative, pending the acquisition of full knowledge of both sexes of the species involved. Whether the male sexes of the Colombian *Poroblatta* have abbreviate and lateral tegmina, as is true of the West Indian species, remains to be determined, also whether certain features of the sculpture, etc., are shared by both sexes. The relationship of the West Indian species to *Acroporoblatta* Hebard,³ another Colombian genus, is less evident, the inflated pronotum of the latter alone being sufficiently distinctive. The third Colombian genus, *Colapteroblatta* Hebard,⁴ is very different, having macropterous males with other characteristic features of body and limbs.

The genus *Parasphæria* Brunner,⁵ the genotype of which is *P. ovata* (Blanchard), from Chile, and to which Brunner in 1892 and 1893 referred the West Indian species, like *Colapteroblatta* has macropterous males, as well as an ovate pronotum in the same sex, and other features which are in no way indicated in the West Indian material in hand. The other South American genera of *Perisphærinæ* of authors other than Hebard,

¹1904, 'Synon. Catal. Orth.,' I, p. 162.

²1919, Trans. Amer. Entom. Soc., XLV, p. 123.

³Idem, p. 126.

⁴Idem, p. 120.

⁵1865, 'Nouv. Syst. Blatt.,' p. 311.

are seen, upon examination, to be not at all closely related to the genus found in the West Indies.

The two West Indian species, which are black in general coloration with reduced and lateral tegmina in both sexes, may be separated by the following features drawn in large part from the original descriptions.

Surface impresso-punctate, particularly so on the abbreviate tegmina. Limbs rufo-ferruginous in coloration. Length of male, 18.5 mm.; length of female, 28. (St. Lucia and Grenada.).....*rufipes* (Brunner).
 Surface sparsely punctate. Limbs rufo-fuscous. Length of male, 22 mm.; length of female, 33. (St. Vincent.).....*nigra* (Brunner).

***Poroblatta rufipes* (Brunner)**

Plate XXIV, Figures 4 to 6

P[erasphæria] (error for *Parasphæria*) *rufipes* BRUNNER, 1893, Proc. Zoöl. Soc. London, p. 604, Pl. LII, fig. 3. ♀; Balthazar, Grenada, West Indies.

ST. LUCIA.—Union, near Castries, IX, 17, 1919, (J. C. Bradley), 1 ♂, [Cornell University].

As the male was previously unknown the following description of the above listed specimen should be of value.

Size medium; form appreciably deplanate on venter, dorsum regularly arcuate in transverse section; surface moderately polished, cribroso-punctate, the largest puncta on the lateral sections of the pronotum, tegmina and meso- and metanotum, on the abdomen the larger puncta are irregularly transverse linear in disposition, the smaller puncta along the segmental bases.

Head almost completely hidden under pronotum, broad, greatest length and breadth subequal, face subdeplanate; occipital outline distinctly arcuate, interspace between eyes very faintly greater than that between antennal scrobes; eyes very faintly elevated above general outline of head, elongate reniform in form; antennæ subequal to half the body in length.

Pronotum subcucullate, cephalad the surface is appreciably impressed dorsad and laterad about the head, which is distinctly embraced by the latero-cephalic sections of the pronotum; in transverse section the pronotum is arcuate, slightly flattened mesad, the lateral intermarginal sections moderately impressed, developing what might be called weak "gutters": general outline of pronotum truncate trigonal, greatest length contained one and one-third times in greatest width, which is caudal; cephalic section truncato-arcuate, laterad narrowly rounding into the diverging moderately arcuate lateral sections, caudal margin subtruncate, caudo-lateral angles very narrowly rounded rectangulate; lateral and cephalic margins cingulate, narrowly so cephalad, progressively more broadly and coarsely so caudad; cribroso-punctations of surface largely grouped laterad.

Tegmina distinctly lateral, sublanceolate in outline, their apices very narrowly surpassing distal margin of mesonotum; costal margin arcuate, thickly cingulate, apex rounded acute. Mesonotum with distal margin faintly concave. Metanotum with distal margin shallowly biconcave.

Abdomen with seventh tergite large, transverse, scoop-like; lateral margins converging, distal margin very broadly arcuate obtuse-angulate. Supra-anal plate almost completely hidden under the enlarged seventh tergite, distal margin arcuate with a median angulate emargination. Cerci very short and conical, not surpassing the distal margin of the supra-anal plate, subdeplanate. Subgenital plate slightly asymmetrical, the free margin in general strongly arcuate, dextral section moderately concave; styles short, simple.

Femora with ventral margins unarmed except for a distal spine on ventro-cephalic margin of cephalic femora, and a rudiment of a similarly located spine on one of the caudal femora. Caudal tarsi with metatarsal pulvillus covering very slightly more than half the ventral surface of metatarsus. Arolia large.

General color shining pitch brown, obscurely delimited areas cephalo-laterad on pronotum dull zinc orange. Much of vicinity of antennal scrobes, genæ and most of mouth-parts, zinc orange to pale ochraceous-orange; eyes deep fuscous; antennæ zinc orange proximad, passing to cinnamon-brown distad. Limbs, including coxæ, cinnamon-rufous to hay's russet; tarsi pale ochraceous-orange. Cerci and styles pale ochraceous-orange, the former tipped with pitch brown.

Length of body, 18.2 mm.; length of pronotum, 6; greatest (caudal) width of pronotum, 8; length of tegmen, 2.9.

From the data now available it is evident the species is distributed over a considerable section of the Lesser Antilles. There can be no doubt but that the two West Indian species of this genus are of not very ancient South American origin.

***Poroblatta nigra* (Brunner)**

P[araphæria] nigra BRUNNER, 1892, Proc. Zool. Soc. London, 1892, p. 206, Pl. xv, fig. 7. ♂, ♀; St. Vincent, West Indies.

The exact localities given for this species are: Lot 14 Estate and west slope of Soufrière volcano at an elevation of 1500 feet, under rotting fruit, in September.

PLATES I to XXV

PLATE I

Fig. 1. *Caribblatta nebulicola*, new species. Ventral aspect of subgenital plate of male (type). Morces Gap, Jamaica. (Greatly enlarged.)

Fig. 2. *Caribblatta picturata*, new species. Pattern of pronotum. Male (type). Adjuntas, Porto Rico. ($\times 10$.)

Fig. 3. *Caribblatta picturata*, new species. Pattern of interocular region and face. Male (type). Adjuntas, Porto Rico. (Greatly enlarged.)

Fig. 4. *Caribblatta picturata*, new species. Ventral aspect of subgenital plate of male (type). Adjuntas, Porto Rico. (Greatly enlarged.)

Fig. 5. *Caribblatta picturata*, new species. Details of single (sinistral) style of subgenital plate of male (type). Adjuntas, Porto Rico. (Greatly enlarged.)

Fig. 6. *Caribblatta unguiculata*, new species. Details of single (sinistral) style of subgenital plate of male (type). San Francisco Mountains, Dominican Republic, Hispaniola. (Greatly enlarged.)

Fig. 7. *Caribblatta glochis*, new species. Ventral aspect of subgenital plate of male (type). Mangrove Cay, Bahamas. (Greatly enlarged.)

Fig. 8. *Caribblatta leucops*, new species. Ventral aspect of subgenital plate of male (type). Port-au-Prince, Haiti, Hispaniola. (Greatly enlarged.)

Fig. 9. *Caribblatta oresteria*, new species. Pattern of pronotum. Male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. ($\times 7\frac{1}{2}$.)

Fig. 10. *Caribblatta oresteria*, new species. Pattern of interocular region and face. Male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (Greatly enlarged.)

Fig. 11. *Caribblatta oresteria*, new species. Ventral aspect of subgenital plate of male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (Greatly enlarged.)

Fig. 12. *Caribblatta cryptobia*, new species. Pattern of interocular region and face. Male (type). Stony Hill, Jamaica. (Greatly enlarged.)

Fig. 13. *Caribblatta cryptobia*, new species. Pattern of pronotum. Male (type). Stony Hill, Jamaica. ($\times 10$.)

Fig. 14. *Caribblatta cryptobia*, new species. Ventral aspect of subgenital plate of male (type). Stony Hill, Jamaica. (Greatly enlarged.)

Fig. 15. *Caribblatta islacolonis*, new species. Pattern of pronotum. Male (type). San Lorenzo, Dominican Republic, Hispaniola. ($\times 11$.)

Fig. 16. *Caribblatta islacolonis*, new species. Pattern of interocular region and face. Male (type). San Lorenzo, Dominican Republic, Hispaniola. (Greatly enlarged.)

Fig. 17. *Caribblatta islacolonis*, new species. Ventral aspect of subgenital plate of male (type). San Lorenzo, Dominican Republic, Hispaniola. (Greatly enlarged.)

Fig. 18. *Caribblatta plagia*, new species. Ventral aspect of subgenital plate of male (type). Arecibo, Porto Rico. (Greatly enlarged.)

Fig. 19. *Caribblatta plagia*, new species. Pattern of pronotum. Male (paratype). Manati, Porto Rico. ($\times 10\frac{1}{2}$.)

Fig. 20. *Caribblatta plagia*, new species. Pattern of interocular region and face. Male (paratype). Manati, Porto Rico. (Greatly enlarged.)

Fig. 21. *Caribblatta stenophrys*, new species. Pattern of interocular region and face. Male (type). Mayaguez, Porto Rico. (Greatly enlarged.)

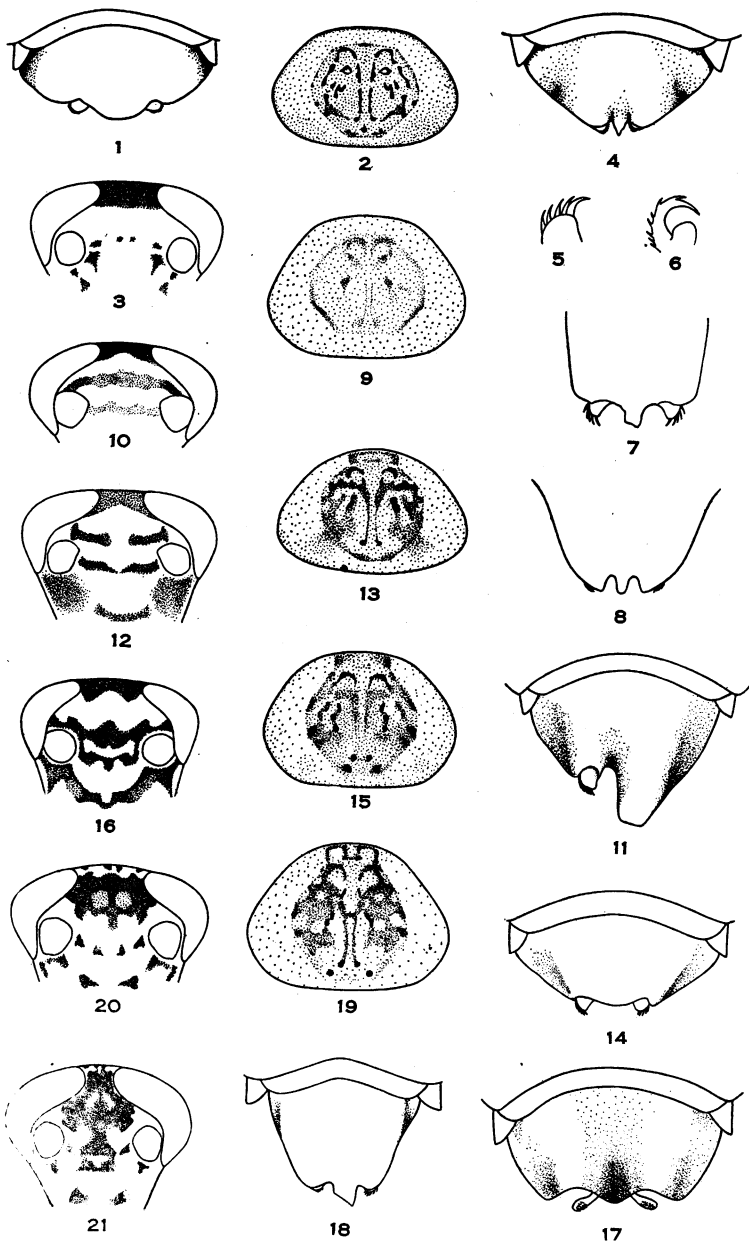


PLATE II

Fig. 1. *Cariblatta stenophrys*, new species. Pattern of pronotum. Male (type). Mayaguez, Porto Rico. ($\times 10\frac{1}{2}$.)

Fig. 2. *Cariblatta stenophrys*, new species. Ventral aspect of subgenital plate of male (type). Mayaguez, Porto Rico. (Greatly enlarged.)

Fig. 3. *Cariblatta antiguensis* (Saussure and Zehntner). Pattern of interocular region and face. Male. Virgin Islands. (Greatly enlarged.)

Fig. 4. *Cariblatta antiguensis* (Saussure and Zehntner). Ventral aspect of subgenital plate of male. Virgin Islands. (Greatly enlarged.)

Fig. 5. *Cariblatta jamaicensis*, new species. Pattern of pronotum. Male (type). BalACLava, Jamaica. ($\times 9\frac{1}{2}$.)

Fig. 6. *Cariblatta jamaicensis*, new species. Pattern of interocular region and face. Male (type). BalACLava, Jamaica. (Greatly enlarged.)

Fig. 7. *Cariblatta jamaicensis*, new species. Ventral aspect of subgenital plate of male (type). BalACLava, Jamaica. (Greatly enlarged.)

Fig. 8. *Cariblatta jamaicensis*, new species. Distal aspect of distal margin of male (type), showing styles. BalACLava, Jamaica. (Greatly enlarged.)

Fig. 9. *Cariblatta insularis* (Walker). Ventral aspect of subgenital plate of female. Montego Bay, Jamaica. (Greatly enlarged.)

Fig. 10. *Cariblatta landalei*, new species. Pattern of pronotum. Male (type). Pleasant Hill, Jamaica. ($\times 9$.)

Fig. 11. *Cariblatta landalei*, new species. Pattern of interocular region and face. Male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 12. *Cariblatta landalei*, new species. Ventral aspect of subgenital plate of male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 13. *Cariblatta landalei*, new species. Details of median emargination of subgenital plate of male (type), as seen from ventral surface. Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 14. *Cariblatta landalei*, new species. Ventral aspect of subgenital plate of female (allotype). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 15. *Neoblattella laodamia*, new species. Pattern of pronotum. Male (type). St. Vincent, West Indies. ($\times 3$.)

Fig. 16. *Neoblattella laodamia*, new species. Dorsal view of apex of abdomen of male (type). St. Vincent, West Indies. ($\times 4$.)

Fig. 17. *Neoblattella laodamia*, new species. Ventral aspect of subgenital plate of male (type). St. Vincent, West Indies. (Greatly enlarged.)

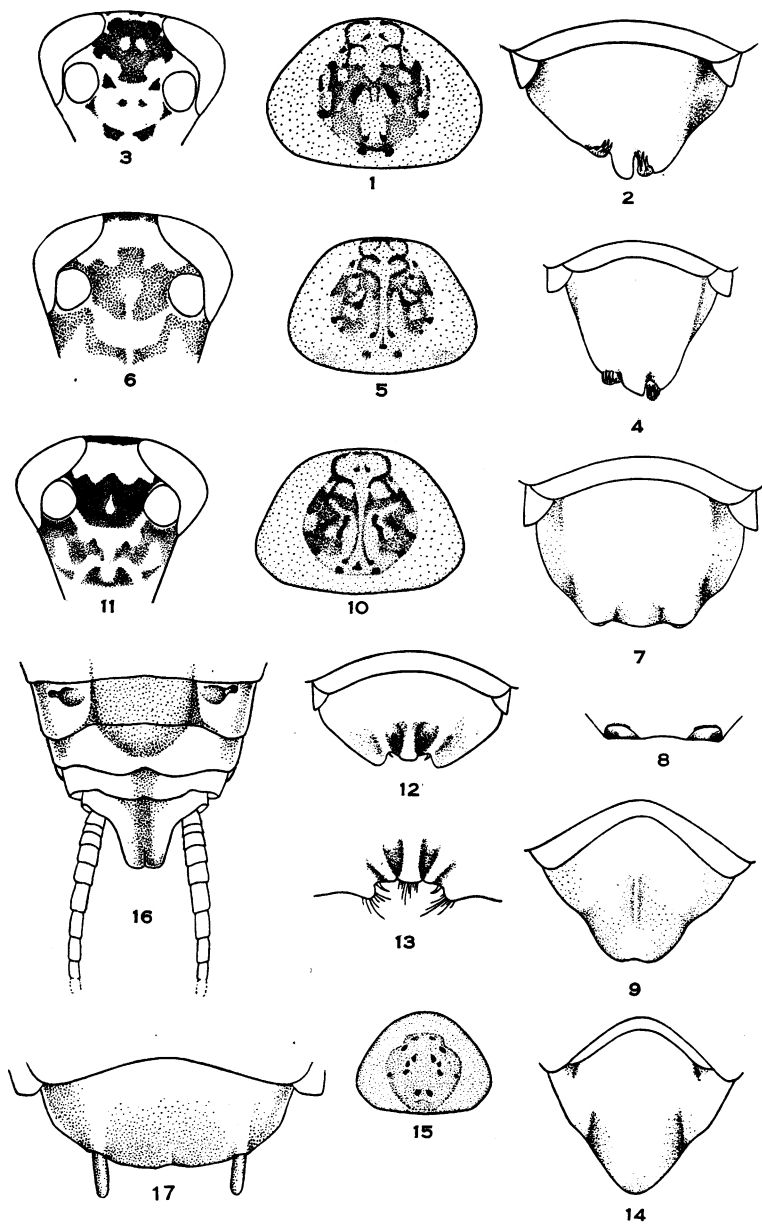


PLATE III

Fig. 1. *Cariblattoides suave*, new genus and species. Dorsal view. Male (type). Aibonito, Porto Rico. ($\times 5$.)

Fig. 2. *Cariblattoides suave*, new genus and species. Palpus. Male (type). Aibonito, Porto Rico. (Greatly enlarged.)

Fig. 3. *Cariblattoides suave*, new genus and species. Cephalic aspect of cephalic femur. Male (type). Aibonito, Porto Rico. (Greatly enlarged.)

Fig. 4. *Cariblattoides suave*, new genus and species. Ventral aspect of subgenital plate of male (type). Aibonito, Porto Rico. (Greatly enlarged.)

Fig. 5. *Cariblattoides suave*, new genus and species. Pattern of pronotum. Female (allotype). Aibonito, Porto Rico. ($\times 9$.)

Fig. 6. *Cariblattoides instigator*, new genus and species. Pattern of pronotum. Male (type). Guantanamo, Cuba. ($\times 7$.)

Fig. 7. *Cariblattoides instigator*, new genus and species. Palpus. Male (type). Guantanamo, Cuba. (Greatly enlarged.)

Fig. 8. *Cariblattoides instigator*, new genus and species. Cephalic aspect of cephalic femur. Male (type). Guantanamo, Cuba. (Greatly enlarged.)

Fig. 9. *Cariblattoides instigator*, new genus and species. Ventral aspect of subgenital plate of male (type). Guantanamo, Cuba. (Greatly enlarged.)

Fig. 10. *Neoblattella carcinus*, new species. Dorsal aspect of supra-anal plate of female (allotype). San Francisco Mountains, Dominican Republic, Hispaniola. (Greatly enlarged.)

Fig. 11. *Neoblattella carcinus*, new species. Ventral aspect of subgenital plate of female (allotype). San Francisco Mountains Dominican Republic, Hispaniola. (Greatly enlarged.)

Fig. 12. *Neoblattella carcinus*, new species. Dorsal aspect of supra-anal plate of male (type). Dominican Republic, Hispaniola. (Greatly enlarged.)

Fig. 13. *Neoblattella carcinus*, new species. Ventral aspect of subgenital plate of male (type). Dominican Republic, Hispaniola. (Greatly enlarged.)

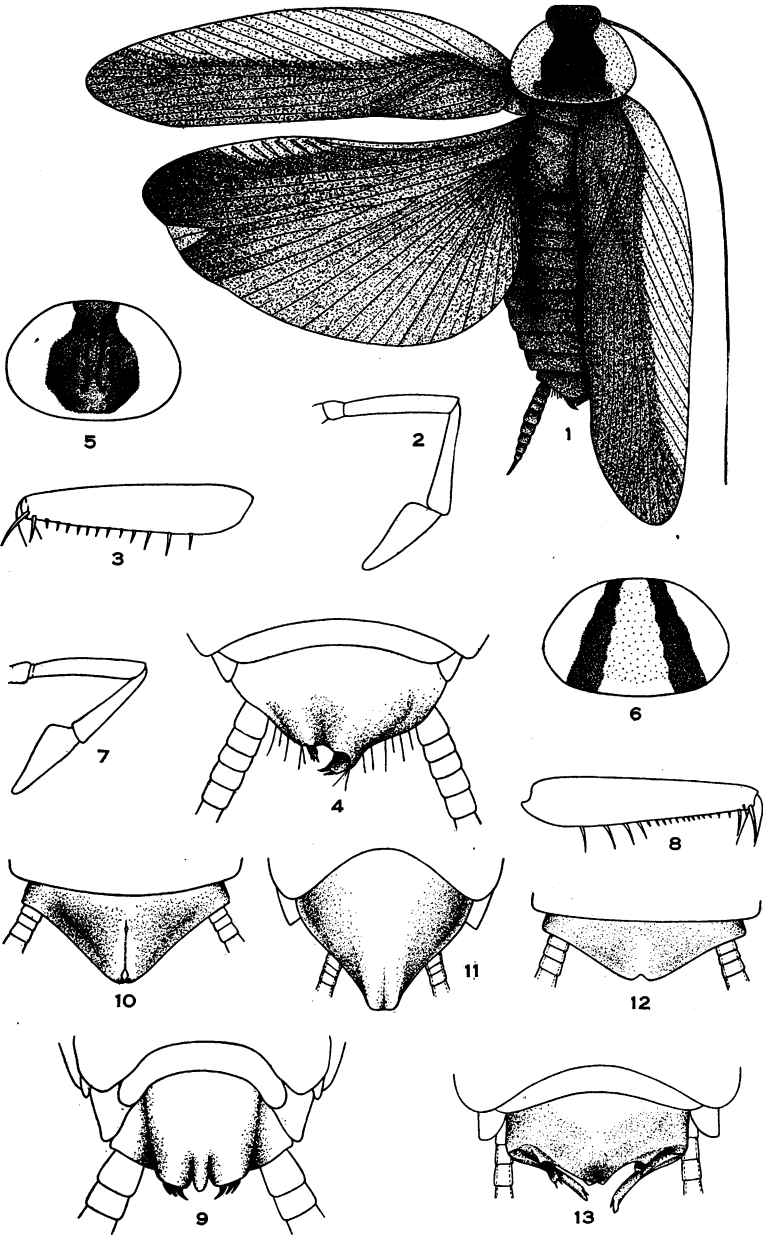


PLATE IV

Fig. 1. *Neoblattella eurydice*, new species. Pattern of pronotum. Male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. ($\times 6\frac{1}{4}$.)

Fig. 2. *Neoblattella eurydice*, new species. Pattern of interocular region and upper portion of face. Male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (Greatly enlarged.)

Fig. 3. *Neoblattella eurydice*, new species. Ventral aspect of subgenital plate of male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (Greatly enlarged.)

Fig. 4. *Neoblattella eurydice*, new species. Tegmen. Male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. ($\times 4$.)

Fig. 5. *Neoblattella proserpina*, new species. Pattern of pronotum. Male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. ($\times 5$.)

Fig. 6. *Neoblattella proserpina*, new species. Ventral aspect of subgenital plate of male (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (Greatly enlarged.)

Fig. 7. *Neoblattella detersa* (Walker). Ventral aspect of subgenital plate of male. Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 8. *Neoblattella celeripes*, new species. Ventral aspect of subgenital plate of male (type). Jamaica. (Greatly enlarged.)

Fig. 9. *Neoblattella celeripes*, new species. Lateral aspect of median production of subgenital plate of male (type). Jamaica. (Greatly enlarged.)

Fig. 10. *Neoblattella tridens*, new species. Pattern of interocular region and upper portion of face. Male (type). Jamaica. (Greatly enlarged.)

Fig. 11. *Neoblattella tridens*, new species. Ventral aspect of subgenital plate of male (type). Jamaica. (Greatly enlarged.)

Fig. 12. *Neoblattella semota*, new species. Pattern of pronotum. Male (type). Pleasant Hill, Jamaica. ($\times 6\frac{1}{2}$.)

Fig. 13. *Neoblattella semota*, new species. Pattern of interocular region and upper portion of face. Male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 14. *Neoblattella semota*, new species. Palpus. Male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 15. *Neoblattella semota*, new species. Ventral aspect of subgenital plate of male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 16. *Neoblattella semota*, new species. Dorsal aspect of supra-anal plate of male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

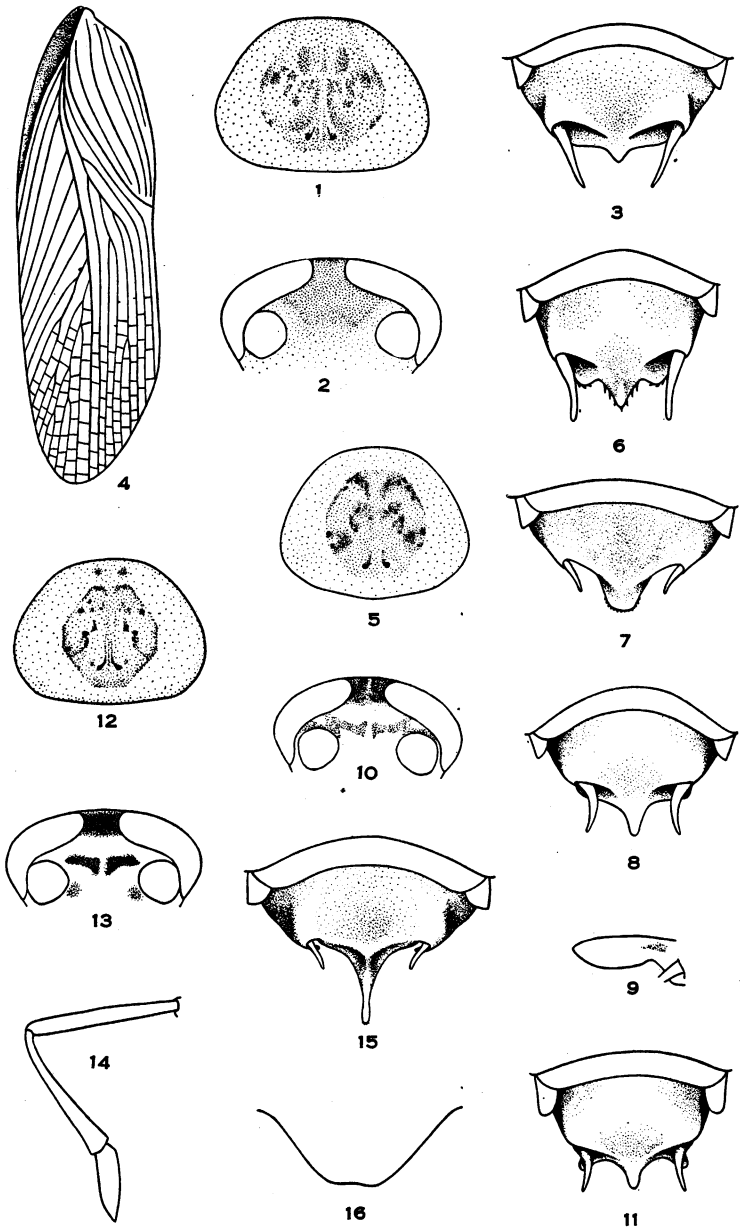


PLATE V

Fig. 1. *Neoblattella vatia*, new species. Dorsal aspect of supra-anal plate of male (type). Cuba. (Greatly enlarged.)

Fig. 2. *Neoblattella vatia*, new species. Outline of caudal aspect of anal chamber of male (type). Cuba. (Greatly enlarged.)

Fig. 3. *Neoblattella vatia*, new species. Ventral aspect of subgenital plate of male (type). Cuba. (Greatly enlarged.)

Fig. 4. *Neoblattella vatia*, new species. Palpus, Female (allotype). Baños de San Vicente, Cuba. (Greatly enlarged.)

Fig. 5. *Neoblattella vatia*, new species. Dorsal aspect of supra-anal plate of female (allotype). Baños de San Vicente, Cuba. (Greatly enlarged.)

Fig. 6. *Neoblattella vatia*, new species. Ventral aspect of subgenital plate of female (allotype). Baños de San Vicente, Cuba. (Greatly enlarged.)

Fig. 7. *Neoblattella detersa* (Walker). Ventral aspect of subgenital plate of male. Stony Hill, Jamaica. (Greatly enlarged.)

Fig. 8. *Neoblattella detersa* (Walker). Lateral view of subgenital plate of male. Stony Hill, Jamaica. (Greatly enlarged.)

Fig. 9. *Neoblattella detersa* (Walker). Dorsal aspect of supra-anal plate of female. Kingston, Jamaica. (Greatly enlarged.)

Fig. 10. *Neoblattella detersa* (Walker). Ventral aspect of subgenital plate of female. Kingston, Jamaica. (Greatly enlarged.)

Fig. 11. *Neoblattella borinquenensis*, new species. Ventral aspect of subgenital plate of male (type). El Yunque, Porto Rico. (Greatly enlarged.)

Fig. 12. *Neoblattella borinquenensis*, new species. Dorsal aspect of supra-anal plate of female (allotype). Manati, Porto Rico. (Greatly enlarged.)

Fig. 13. *Neoblattella borinquenensis*, new species. Ventral aspect of subgenital plate of female (allotype). Manati, Porto Rico. (Greatly enlarged.)

Fig. 14. *Neoblattella vomer*, new species. Dorsal aspect of supra-anal plate of male (type). Mayaguez, Porto Rico. (Greatly enlarged.)

Fig. 15. *Neoblattella vomer*, new species. Ventral aspect of subgenital plate of male (type). Mayaguez, Porto Rico. (Greatly enlarged.)

Fig. 16. *Neoblattella vomer*, new species. Lateral aspect of subgenital plate of male (type). Mayaguez, Porto Rico. (Greatly enlarged.)

Fig. 17. *Neoblattella vomer*, new species. Dorsal aspect of supra-anal plate of female (allotype). Adjuntas, Porto Rico. (Greatly enlarged.)

Fig. 18. *Neoblattella vomer*, new species. Ventral aspect of subgenital plate of female (allotype). Adjuntas, Porto Rico. (Greatly enlarged.)

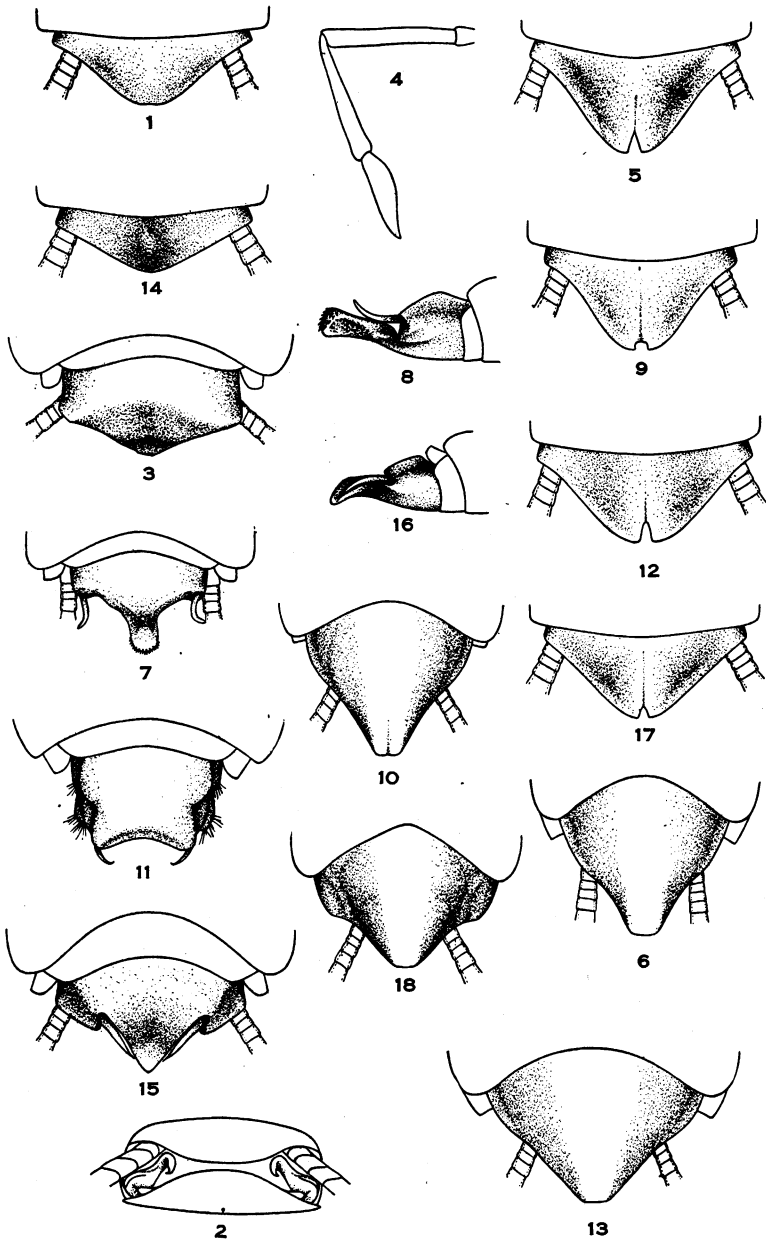


PLATE VI

Fig. 1. *Neoblattella infausta*, new species. Outline of tegmen. Female (paratype). Port-au-Prince, Haiti. ($\times 4$.)

Fig. 2. *Neoblattella infausta*, new species. Pattern of interocular region and upper portion of face. Female (paratype). Port-au-Prince, Haiti. (Greatly enlarged.)

Fig. 3. *Neoblattella grossbecki*, new species. Outline of tegmen. Female (type). Cinchona, Jamaica. ($\times 4$.)

Fig. 4. *Neoblattella grossbecki*, new species. Pattern of interocular region and upper portion of face. Female (type). Cinchona, Jamaica. (Greatly enlarged.)

Fig. 5. *Neoblattella lucubrans*, new species. Outline of tegmen. Male (type). Pleasant Hill, Jamaica. ($\times 4$.)

Fig. 6. *Neoblattella lucubrans*, new species. Pattern of interocular region and upper portion of face. Male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 7. *Neoblattella lucubrans*, new species. Pattern of pronotum. Male (type). Pleasant Hill, Jamaica. ($\times 6\frac{1}{4}$.)

Fig. 8. *Neoblattella lucubrans*, new species. Ventral aspect of subgenital plate of male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 9. *Neoblattella dryas*, new species. Outline of tegmen. Male (type). Morces Gap, Jamaica. ($\times 4$.)

Fig. 10. *Neoblattella dryas*, new species. Pattern of pronotum. Male (type). Morces Gap, Jamaica. ($\times 6\frac{1}{4}$.)

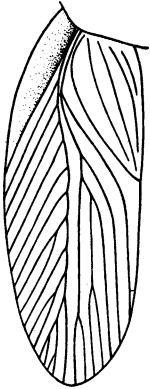
Fig. 11. *Neoblattella dryas*, new species. Pattern of interocular region and upper portion of face. Male (type). Morces Gap, Jamaica. (Greatly enlarged.)

Fig. 12. *Neoblattella dryas*, new species. Ventral aspect of subgenital plate of male (type). Morces Gap, Jamaica. (Greatly enlarged.)

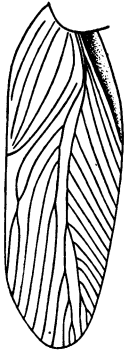
Fig. 13. *Pseudosymploce schistopyga*, new genus and species. Dorsal surface of supra-anal plate of male (type). Port Antonio, Jamaica. (Greatly enlarged.)

Fig. 14. *Pseudosymploce schistopyga*, new genus and species. Ventral aspect of subgenital plate of male (type). Port Antonio, Jamaica. (Greatly enlarged.)

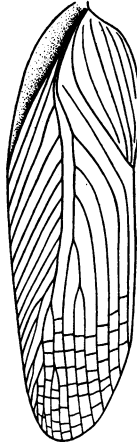
Fig. 15. *Pseudosymploce schistopyga*, new genus and species. Dorsal surface of supra-anal plate of female (allotype). Pleasant Hill, Jamaica. (Greatly enlarged.)



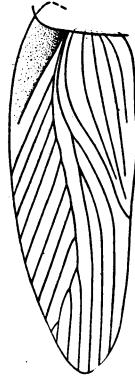
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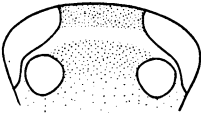
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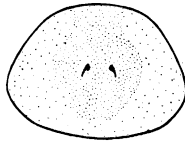
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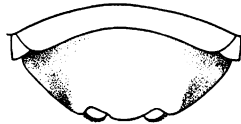
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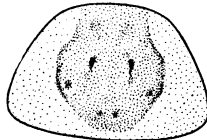
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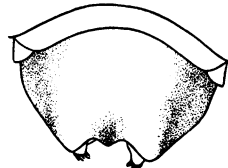
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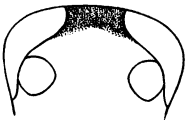
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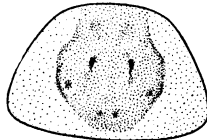
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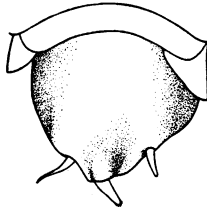
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PLATE VII

Fig. 1. *Neoblattella grossbecki*, new species. Pattern of pronotum. Female (type). Cinchona, Jamaica. ($\times 7$.)

Fig. 2. *Neoblattella grossbecki*, new species. Pattern of interocular region and face. Female (type). Cinchona, Jamaica. (Greatly enlarged.)

Fig. 3. *Neoblattella grossbecki*, new species. Palpus. Female (type). Cinchona, Jamaica. (Greatly enlarged.)

Fig. 4. *Neoblattella grossbecki*, new species. Cephalic aspect of cephalic femur. Female (type). Cinchona, Jamaica. (Greatly enlarged.)

Fig. 5. *Neoblattella infausta*, new species. Pattern of pronotum. Female (type). Haiti. ($\times 6\frac{1}{2}$.)

Fig. 6. *Neoblattella infausta*, new species. Cephalic aspect of cephalic femur. Female (type). Haiti. (Greatly enlarged.)

Fig. 7. *Nymphodromia miranda*, new genus and species. Pattern of pronotum. Male (type). San Francisco Mountains, Dominican Republic. ($\times 7\frac{1}{2}$.)

Fig. 8. *Nymphodromia miranda*, new genus and species. Tegmen. Male (type). San Francisco Mountains, Dominican Republic. ($\times 5\frac{1}{2}$.)

Fig. 9. *Nymphodromia miranda*, new genus and species. Palpus. Male (type). San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 10. *Nymphodromia miranda*, new genus and species. Cephalic aspect of cephalic femur. Male (type). San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 11. *Nymphodromia miranda*, new genus and species. Dorsal aspect of supra-anal plate of male (type). San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 12. *Nymphodromia miranda*, new genus and species. Ventral aspect of subgenital plate of male (type). San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 13. *Nymphodromia miranda*, new genus and species. Ventral aspect of subgenital plate of female (allotype). San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 14. *Pseudosymploce elongata* (Beauvois). Pronotum. Male. San Francisco Mountains, Dominican Republic. ($\times 5\frac{1}{2}$.)

Fig. 15. *Pseudosymploce elongata* (Beauvois). Dorsal aspect of supra-anal plate of male. San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 16. *Pseudosymploce elongata* (Beauvois). Caudal aspect of anal orifice of male. San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 17. *Pseudosymploce elongata* (Beauvois). Ventral aspect of subgenital plate of male. San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

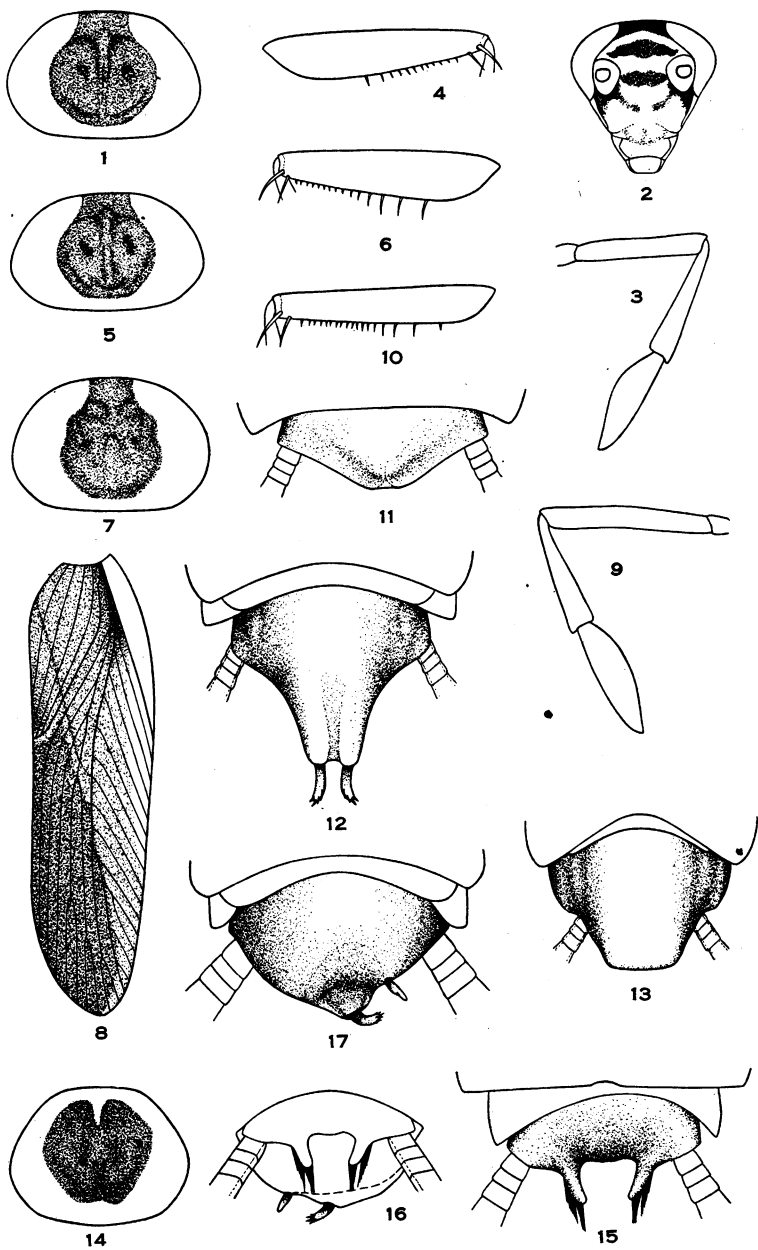


PLATE VIII

Fig. 1. *Ischnoptera podoces*, new species. Pattern of interocular region and face. Male (type). Morces Gap, Jamaica. (Greatly enlarged.)

Fig. 2. *Ischnoptera podoces*, new species. Pronotum. Male (type). Morces Gap, Jamaica. ($\times 6\frac{1}{2}$.)

Fig. 3. *Ischnoptera podoces*, new species. Ventral aspect of subgenital plate of male (type). Morces Gap, Jamaica. (Greatly enlarged.)

Fig. 4. *Ischnoptera podoces*, new species. Dorsal aspect of supra-anal plate of male (type). (Partially restored.) Morces Gap, Jamaica. (Greatly enlarged.)

Fig. 5. *Ischnoptera podoces*, new species. Caudal aspect of supra-anal plate of male (type), showing bulbous ridges on ventral surface. Morces Gap, Jamaica. (Greatly enlarged.)

Fig. 6. *Ischnoptera oreochares*, new species. Pattern of interocular region and face. Male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 7. *Ischnoptera oreochares*, new species. Wing. Male (type). Pleasant Hill, Jamaica. ($\times 3$.)

Fig. 8. *Ischnoptera oreochares*, new species. Dorsal aspect of apex of abdomen of male (type). (Supra-anal plate partially restored.) Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 9. *Ischnoptera oreochares*, new species. Ventral aspect of subgenital plate of male (type). Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 10. *Ischnoptera oreochares*, new species. Caudal aspect of anal orifice of male (type), showing concealed genitalia. Pleasant Hill, Jamaica. (Greatly enlarged.)

Fig. 11. *Ischnoptera oreochares*, new species. Dorsal aspect of apex of abdomen of female (allotype). Cinchona, Jamaica. (Greatly enlarged.)

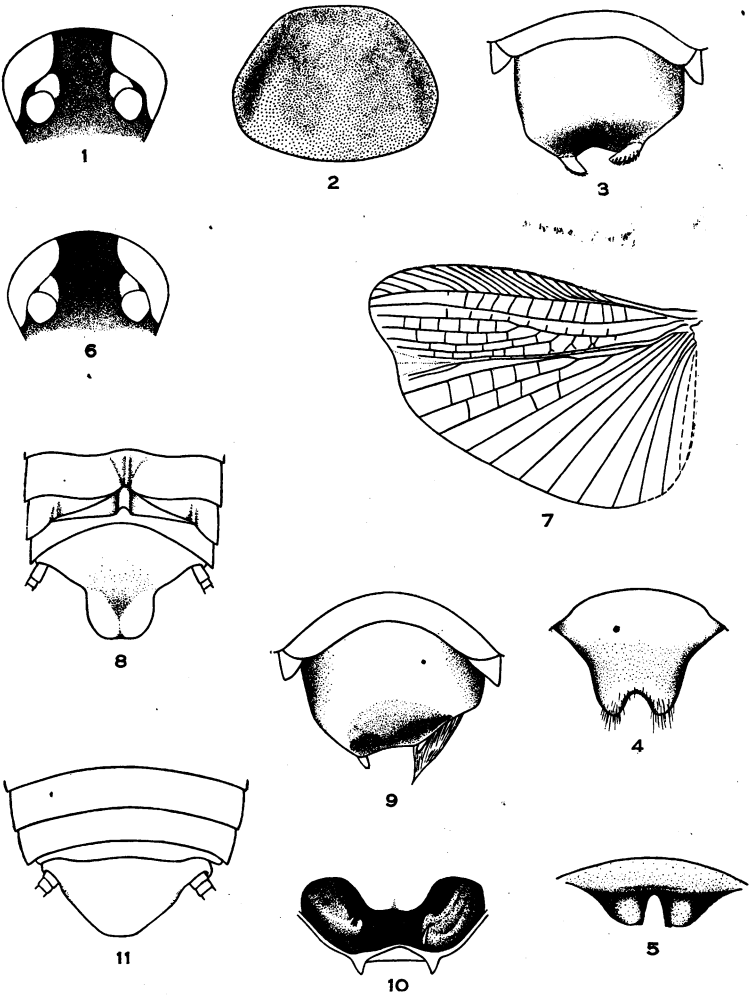


PLATE IX

Fig. 1. *Pseudosymploce elongata* (Beauvois). Palpus. Male. San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 2. *Pseudosymploce elongata* (Beauvois). Cephalic aspect of cephalic femur. Male. San Francisco Mountains, Dominican Republic. (Greatly enlarged.)

Fig. 3. *Pseudosymploce elongata* (Beauvois). Dorsal aspect of supra-anal plate of female. San Lorenzo, Dominican Republic. (Greatly enlarged.)

Fig. 4. *Pseudosymploce elongata* (Beauvois). Wing. Female. San Lorenzo, Dominican Republic. ($\times 4$.)

Fig. 5. *Ischnoptera ligula*, new species. Dorsal aspect of supra-anal plate of male (type). Havana, Cuba. (Greatly enlarged.)

Fig. 6. *Ischnoptera ligula*, new species. Caudal aspect of apex of abdomen of male (type). Havana, Cuba. (Greatly enlarged.)

Fig. 7. *Ischnoptera ligula*, new species. Ventral aspect of subgenital plate of male (type). Havana, Cuba. (Greatly enlarged.)

Fig. 8. *Nelipophygus ramsdeni*, new genus and species. Dorsal outline of male (type). Rio Seco, San Carlos Estate, near Guantanamo, Cuba. ($\times 2\frac{1}{2}$.)

Fig. 9. *Nelipophygus ramsdeni*, new genus and species. Cephalic aspect of head. Male (type). Rio Seco, San Carlos Estate, near Guantanamo, Cuba. ($\times 5$.)

Fig. 10. *Nelipophygus ramsdeni*, new genus and species. Palpus. Male (type). Rio Seco, San Carlos Estate, near Guantanamo, Cuba. (Greatly enlarged.)

Fig. 11. *Nelipophygus ramsdeni*, new genus and species. Cephalic aspect of cephalic femur. Male (type). Rio Seco, San Carlos Estate, near Guantanamo, Cuba. (Greatly enlarged.)

Fig. 12. *Nelipophygus ramsdeni*, new genus and species. Apex of tarsus. Male (type). Rio Seco, San Carlos Estate, near Guantanamo, Cuba. (Greatly enlarged.)

Fig. 13. *Nelipophygus ramsdeni*, new genus and species. Caudal limb. Female (allotype). Monte Libano, near Guantanamo, Cuba. ($\times 5$.)

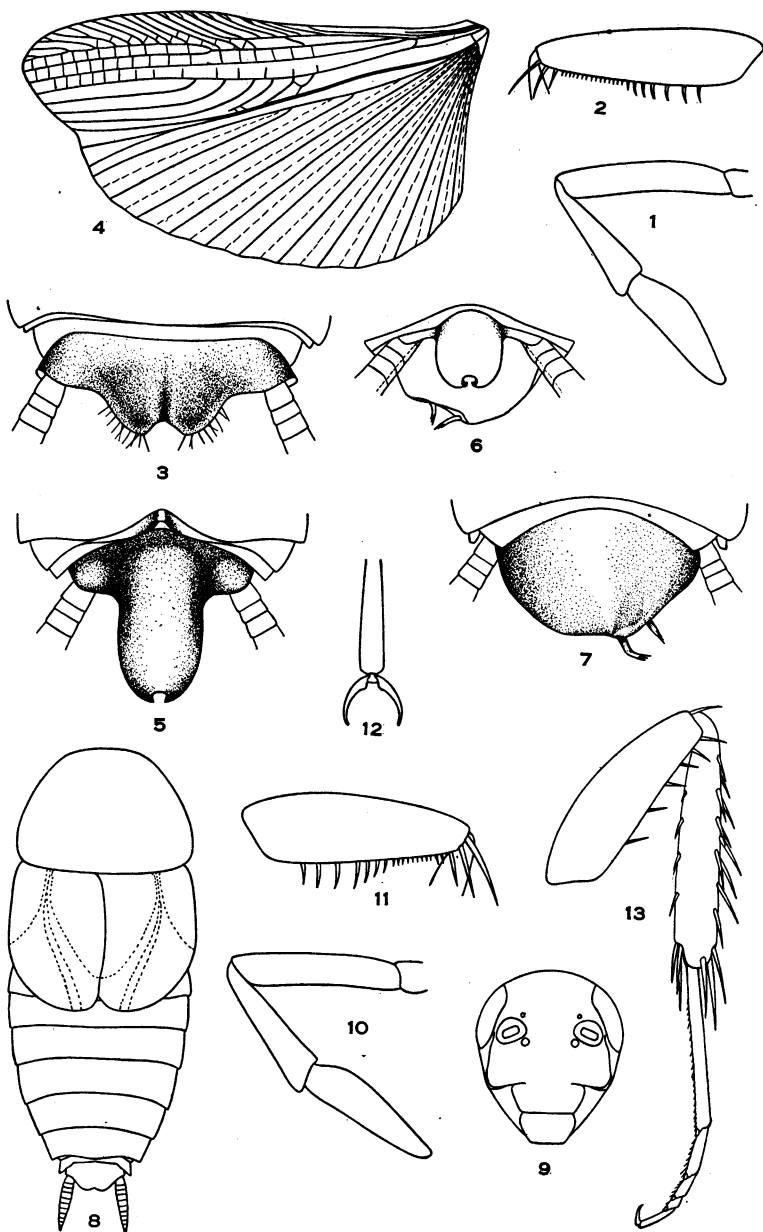


PLATE X

Fig. 1. *Nelipophygus ramsdeni*, new genus and species. Dorsal aspect of supra-anal plate of male (type). Rio Seco, San Carlos Estate, near Guantanamo, Cuba. (Greatly enlarged.)

Fig. 2. *Nelipophygus ramsdeni*, new genus and species. Ventral aspect of subgenital plate of male (type). Rio Seco, San Carlos Estate, near Guantanamo, Cuba. (Greatly enlarged.)

Fig. 3. *Nelipophygus ramsdeni*, new genus and species. Ventral aspect of subgenital plate of female (allotype). Monte Libano, near Guantanamo, Cuba. (Greatly enlarged.)

Fig. 4. *Symploce cristata*, new species. Dorsal aspect of apex of abdomen of male (type). Port-au-Prince, Haiti. (Greatly enlarged.)

Fig. 5. *Symploce cristata*, new species. Details of specialization of ninth abdominal tergite of male (type). Port-au-Prince, Haiti. (Greatly enlarged.)

Fig. 6. *Symploce bilabiata*, new species. Dorsal aspect of supra-anal plate of male (type). Culebra Island. (Greatly enlarged.)

Fig. 7. *Symploce bilabiata*, new species. Ventral aspect of subgenital plate of male (type). Culebra Island. (Greatly enlarged.)

Fig. 8. *Symploce bilabiata*, new species. Caudal aspect of apex of abdomen of male (type). Culebra Island. (Greatly enlarged.)

Fig. 9. *Symploce bilabiata*, new species. Marginal field and base of scapular field of dextral tegmen. Female (allotype). Culebra Island. (Greatly enlarged.)

Fig. 10. *Symploce flagellata* Hebard. Marginal field and base of scapular field of dextral tegmen. Male (paratype). Mona Island. (Greatly enlarged.)

Fig. 11. *Nesomylacris cubensis*, new genus and species. Palpus. Male (type). Twelve and one-half kilometers south of Pinar del Rio, Cuba. (Greatly enlarged.)

Fig. 12. *Nesomylacris cubensis*, new genus and species. Dorsal aspect of supra-anal plate of male (type). Twelve and one-half kilometers south of Pinar del Rio, Cuba. (Greatly enlarged.)

Fig. 13. *Nesomylacris cubensis*, new genus and species. Ventral aspect of subgenital plate of male (type). Twelve and one-half kilometers south of Pinar del Rio, Cuba. (Greatly enlarged.)

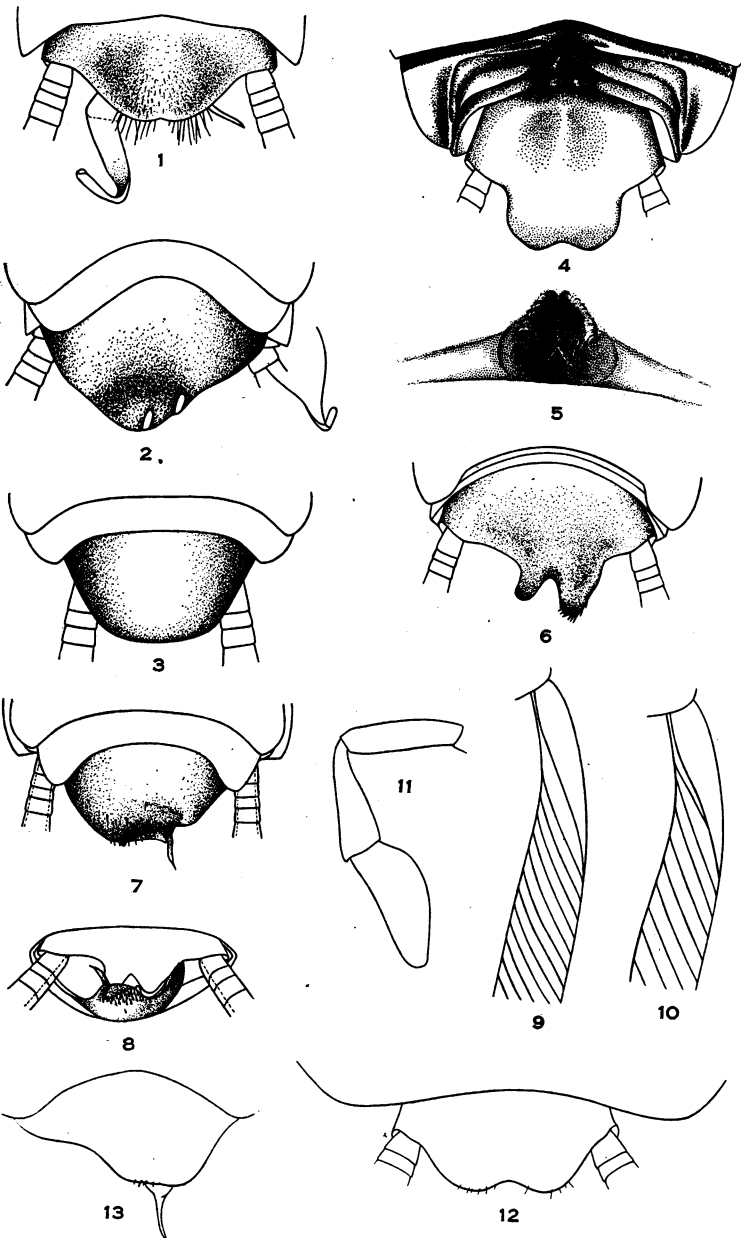


PLATE XI

Fig. 1. *Nesomylacris cubensis*, new genus and species. Dorsal outline of male (type). Twelve and one-half kilometers south of Pinar del Rio, Cuba. ($\times 4$.)

Fig. 2. *Nesomylacris relicta*, new genus and species. Outline of male (type). Stony Hill, Jamaica. ($\times 4\frac{1}{2}$.)

Fig. 3. *Nesomylacris relicta*, new genus and species. Palpus. Male (type). Stony Hill, Jamaica. (Greatly enlarged.)

Fig. 4. *Nesomylacris relicta*, new genus and species. Dorsal aspect of supra-anal plate of male (type). Stony Hill, Jamaica. (Greatly enlarged.)

Fig. 5. *Nesomylacris relicta*, new genus and species. Ventral aspect of subgenital plate of male (type). Stony Hill, Jamaica. (Greatly enlarged.)

Fig. 6. *Pelmatosilpha coriacea* Rehn. Dorsal outline. Female. Adjuntas, Porto Rico. ($\times 2$.)

Fig. 7. *Pelmatosilpha coriacea* Rehn. Dorsal aspect of supra-anal plate of male. Baños de Coamo, Porto Rico. (Greatly enlarged.)

Fig. 8. *Pelmatosilpha coriacea* Rehn. Ventral aspect of subgenital plate of male. Baños de Coamo, Porto Rico. (Greatly enlarged.)

Fig. 9. *Pelmatosilpha coriacea* Rehn. Outline of sinistral genital hook of male. Baños de Coamo, Porto Rico. (Greatly enlarged.)

Fig. 10. *Pelmatosilpha coriacea* Rehn. Outline of dextral genital hook of male. Baños de Coamo, Porto Rico. (Greatly enlarged.)

Fig. 11. *Pelmatosilpha coriacea* Rehn. Outline of sinistral tegmen. Male. Mona Island. ($\times 3$.)

Fig. 12. *Pelmatosilpha purpurascens* (Kirby). Outline of sinistral genital hook of male. Long Ditton, Dominica. (Greatly enlarged.)

Fig. 13. *Pelmatosilpha purpurascens* (Kirby). Outline of dextral genital hook of male. Long Ditton, Dominica. (Greatly enlarged.)

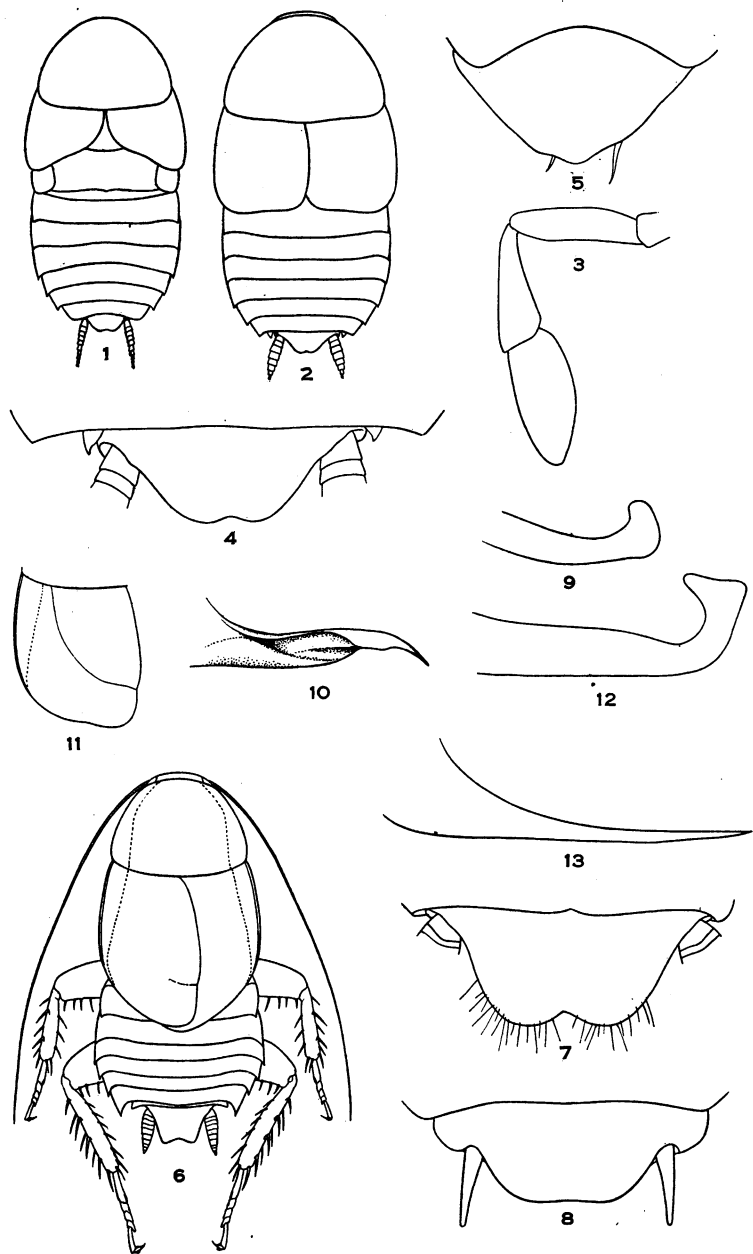


PLATE XII

Fig. 1. *Pelmatosilpha purpurascens* (Kirby). Dorsal aspect of supra-anal plate of male. Long Ditton, Dominica. (Greatly enlarged.)

Fig. 2. *Pelmatosilpha purpurascens* (Kirby). Ventral aspect of subgenital plate of male. Long Ditton, Dominica. (Greatly enlarged.)

Fig. 3. *Pelmatosilpha occidentalis* (Saussure). Outline of sinistral tegmen. Male. St. Pierre, Martinique. ($\times 3\frac{1}{2}$.)

Fig. 4. *Pelmatosilpha occidentalis* (Saussure). Dorsal aspect of supra-anal plate and cerci of male. St. Pierre, Martinique. (Greatly enlarged.)

Fig. 5. *Pelmatosilpha occidentalis* (Saussure). Outline of sinistral genital hook of male. St. Pierre, Martinique. (Greatly enlarged.)

Fig. 6. *Eurycotis lacernata* Cabrera. Dorsal aspect. Female. Cotorro, Cuba. ($\times 1\frac{1}{2}$.)

Fig. 7. *Eurycotis lacernata* Cabrera. Cephalic aspect of face. Female. Cotorro, Cuba. (Enlarged.)

Fig. 8. *Eurycotis bahamensis* Rehn. Outline of caudal tarsus. Male. Mangrove Cay, Andros, Bahamas. (Greatly enlarged.)

Fig. 9. *Eurycotis torquinensis*, new species. Dorsal aspect. Male (type). Torquino Peak, 5800 feet, Oriente, Cuba. ($\times 1\frac{1}{2}$.)

Fig. 10. *Eurycotis torquinensis*, new species. Cephalic aspect of male. Male (type). Torquino Peak, 5800 feet, Oriente, Cuba. (Enlarged.)

Fig. 11. *Eurycotis torquinensis*, new species. Outline of sinistral genital hook of male (type). Torquino Peak, 5800 feet, Oriente, Cuba. (Greatly enlarged.)

Fig. 12. *Eurycotis torquinensis*, new species. Outline of dextral genital hook of male (type). Torquino Peak, 5800 feet, Oriente, Cuba. (Greatly enlarged.)

Fig. 13. *Eurycotis balteata* Cabrera. Dorsal aspect of supra-anal plate of male. Cotorro, Cuba. (Greatly enlarged.)

Fig. 14. *Eurycotis balteata* Cabrera. Extensor face of caudal tibia. Male. Cotorro, Cuba. (Enlarged.)

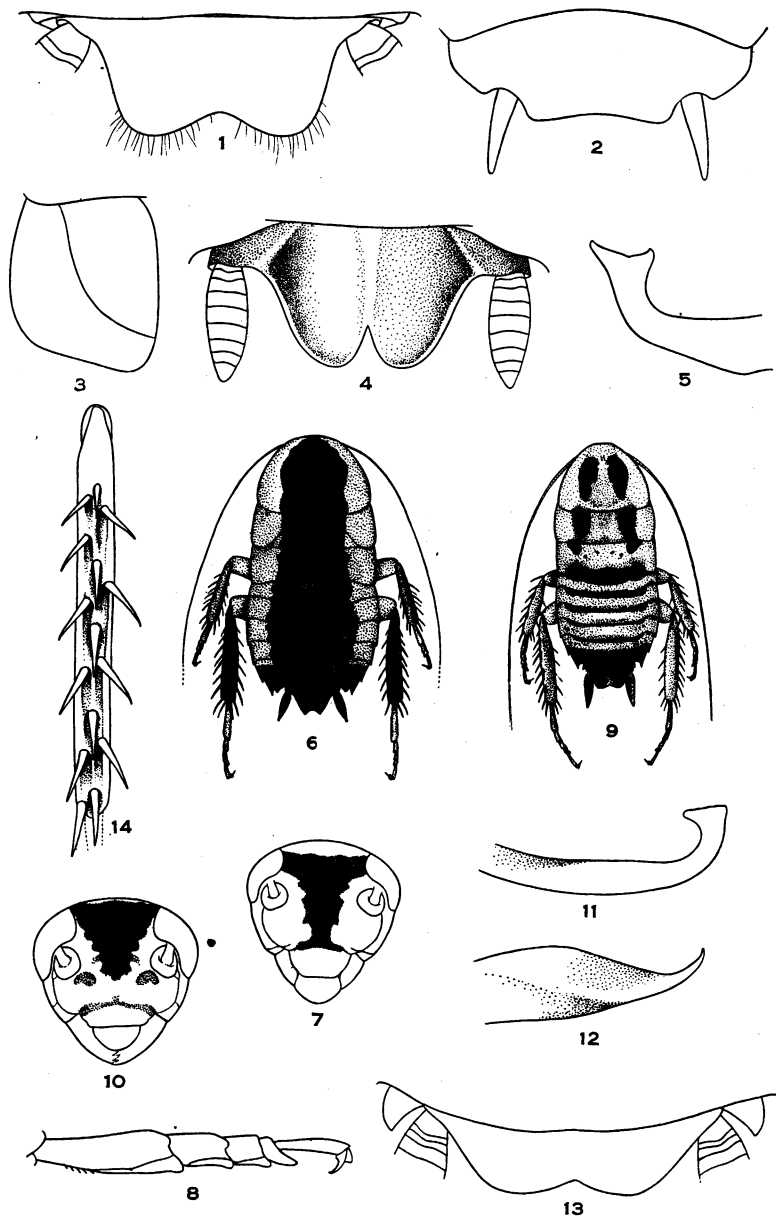


PLATE XIII

Fig. 1. *Eurycotis balteata* Cabrera. Dorsal aspect. Male. Cotorro, Cuba. ($\times 1\frac{1}{2}$.)

Fig. 2. *Eurycotis ferrum-equinum*, new species. Dorsal aspect. Male (type). La Union, Monte Libano, Oriente, Cuba. ($\times 1\frac{1}{2}$.)

Fig. 3. *Eurycotis ferrum-equinum*, new species. Extensor face of caudal tibia. Male (type). La Union, Monte Libano, Oriente, Cuba. (Enlarged.)

Fig. 4. *Eurycotis ferrum-equinum*, new species. Dorsal aspect of supra-anal plate of male (type). La Union, Monte Libano, Oriente, Cuba. (Greatly enlarged.)

Fig. 5. *Eurycotis ferrum-equinum*, new species. Dorsal aspect of supra-anal plate of female (allotype). La Union, Monte Libano, Oriente, Cuba. (Greatly enlarged.)

Fig. 6. *Eurycotis galeoides*, new species. Dorsal aspect. Male (type). La Union, Monte Libano, Oriente, Cuba. ($\times 1\frac{1}{2}$.)

Fig. 7. *Eurycotis galeoides*, new species. Dorsal aspect of supra-anal plate of male (type). La Union, Monte Libano, Oriente, Cuba. (Greatly enlarged.)

Fig. 8. *Eurycotis dimidiata* (Bolivar). Dorsal view. Male. Arroyo Hondo, Guantanamo, Oriente, Cuba. ($\times 1\frac{1}{2}$.)

Fig. 9. *Eurycotis dimidiata* (Bolivar). Dorsal outline of supra-anal plate of male. Arroyo Hondo, Guantanamo, Oriente, Cuba. (Greatly enlarged.)

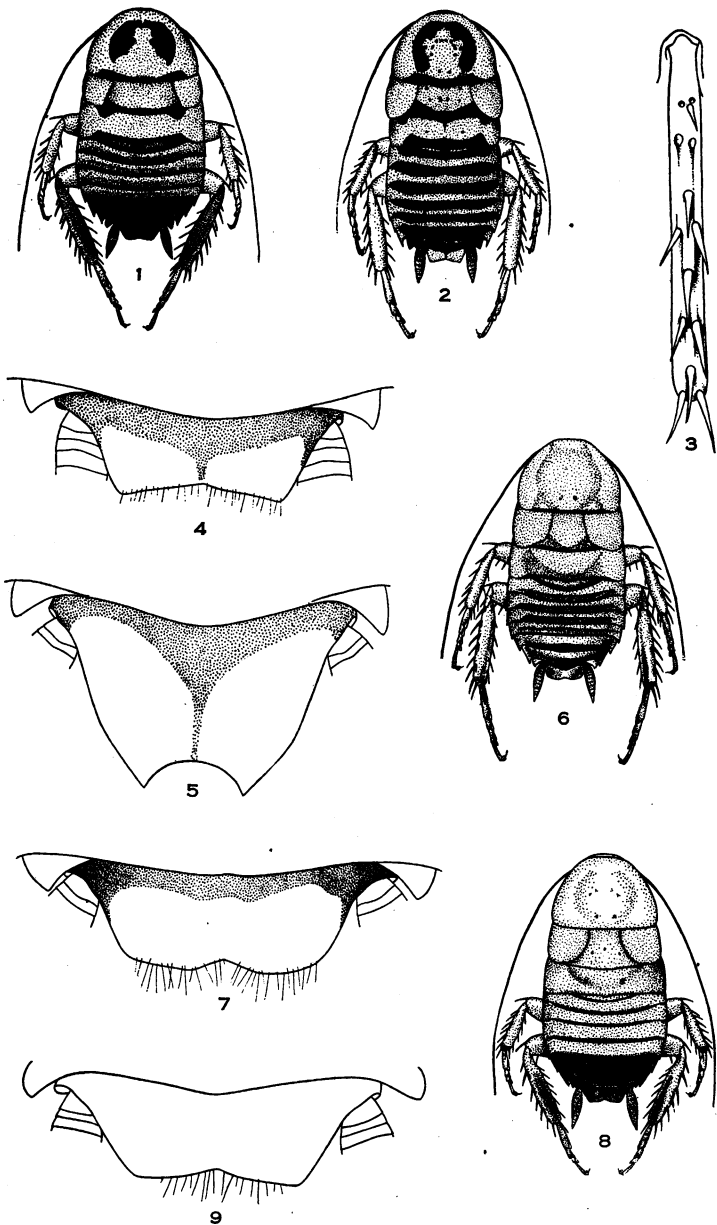


PLATE XIV

Fig. 1. *Eurycotis scalaris*, new species. Dorsal view. Male (type). Arroyo Hondo, Guanatanamo, Oriente, Cuba. ($\times 1\frac{1}{2}$.)

Fig. 2. *Eurycotis scalaris*, new species. Outline of dextral genital spine of male (type). Arroyo Hondo, Guantanamo, Oriente, Cuba. (Greatly enlarged.)

Fig. 3. *Eurycotis caraibea* (Bolivar). Dorsal view. Male. Monte Libano, Oriente, Cuba. ($\times 1\frac{1}{2}$.)

Fig. 4. *Eurycotis caraibea* (Bolivar). Outline of dextral genital spine of male (type). Monte Libano, Oriente, Cuba. (Greatly enlarged.)

Fig. 5. *Eurycotis taurus*, new species. Dorsal aspect of supra-anal plate of male (type). Vicinity of Sama, Oriente, Cuba. (Greatly enlarged.)

Fig. 6. *Eurycotis taurus*, new species. Ventral aspect of subgenital plate of male (type). Vicinity of Sama, Oriente, Cuba. (Greatly enlarged.)

Fig. 7. *Eurycotis taurus*, new species. Outline of sinistral genital hook of male (type). Vicinity of Sama, Oriente, Cuba. (Greatly enlarged.)

Fig. 8. *Eurycotis taurus*, new species. Dorsal view. Female (allotype). Ojo de Agua de Filipinas, Oriente, Cuba. (Natural size.)

Fig. 9. *Eurycotis cribrosa*, new species. Dorsal view. Female (type). Los Caños, Guantanamo, Oriente, Cuba. ($\times 1\frac{1}{2}$.)

Fig. 10. *Henicotyle antillarum* (Brunner). Lateral outline of caudal tarsus. Female. Laudet, Dominica. (Greatly enlarged.)

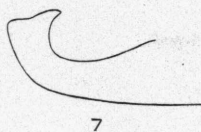
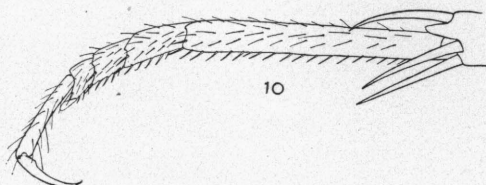
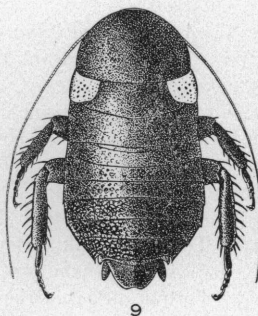
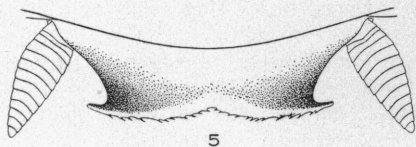
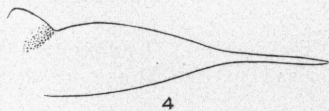
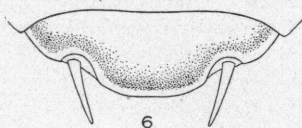
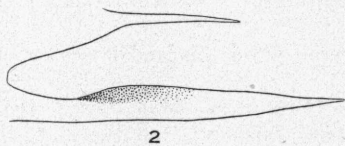
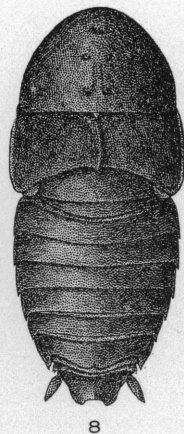
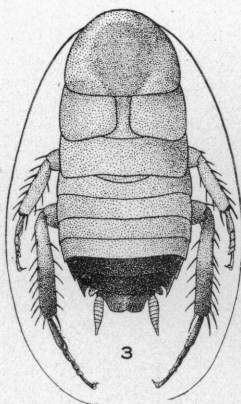
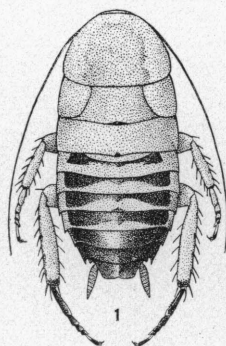


PLATE XV

Fig. 1. *Nyctibora stygia* Walker. Dorsal aspect of supra-anal plate of male. Manville, Haiti. (Greatly enlarged.)

Fig. 2. *Nyctibora stygia* Walker. Ventral aspect of subgenital plate of male. Manville, Haiti. (Greatly enlarged.)

Fig. 3. *Nyctibora stygia* Walker. Lateral outline of caudal tarsus. Male. Manville, Haiti. (Greatly enlarged.)

Fig. 4. *Audreia jamaicana*, new species. Dorsal view. Male (type). Between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. ($\times 3$.)

Fig. 5. *Audreia jamaicana*, new species. Outline of distal palpal joints. Male (type). Between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. (Greatly enlarged.)

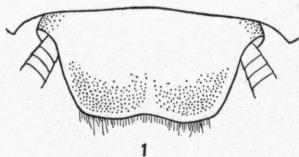
Fig. 6. *Audreia jamaicana*, new species. Ventral aspect of subgenital plate of male (type). Between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. (Greatly enlarged.)

Fig. 7. *Audreia jamaicana*, new species. Dorsal outline. Female (allotype). Between Pleasant Hill and St. Helens Gap, Blue Mountains, Jamaica. ($\times 3$.)

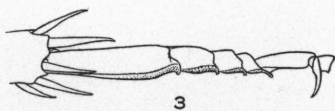
Fig. 8. *Audreia hamiltoni* (Rehn). Dorsal view. Male (allotype). Torquino Peak, Oriente, Cuba. ($\times 3$.)

Fig. 9. *Audreia hamiltoni* (Rehn). Ventral aspect of subgenital plate of male (allotype). Torquino Peak, Oriente, Cuba. (Greatly enlarged.)

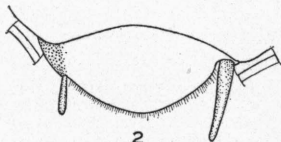
Fig. 10. *Audreia hamiltoni* (Rehn). Outline of distal palpal joints. Male (allotype). Torquino Peak, Oriente, Cuba. (Greatly enlarged.)



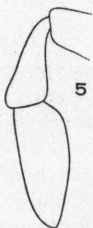
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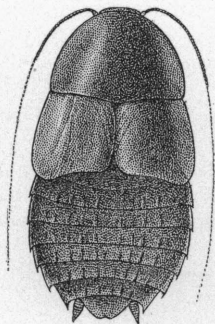
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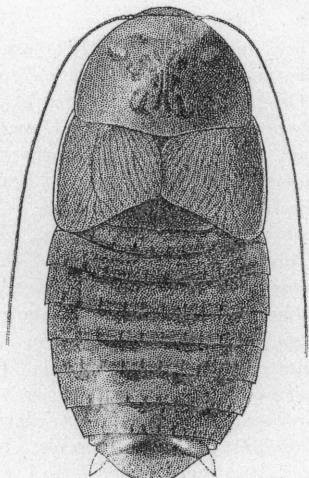
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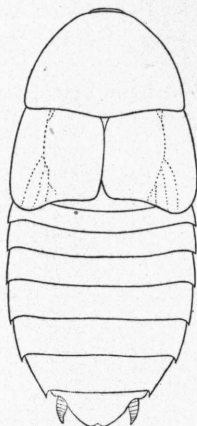
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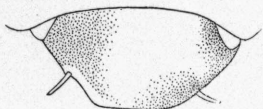
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PLATE XVI

Fig. 1. *Nyctibora lutzi*, new species. Dorsal aspect of supra-anal plate of male (type). Ensenada, Porto Rico. (Greatly enlarged.)

Fig. 2. *Nyctibora lutzi*, new species. Dorsal outline of pronotum. Male (type). Ensenada, Porto Rico. ($\times 2$.)

Fig. 3. *Nyctibora brunnea* (Thunberg). Dorsal aspect of supra-anal plate of male. Peixe Boi, Pará, Brazil. (Greatly enlarged.)

Fig. 4. *Nyctibora brunnea* (Thunberg.) Dorsal outline of pronotum. Male. Peixe Boi, Pará, Brazil. ($\times 2$.)

Fig. 5. *Nyctibora lævigata* (Beauvois). Dorsal aspect of supra-anal plate of male. Montego Bay, Jamaica. (Greatly enlarged.)

Fig. 6. *Epilampra insularis* Bolivar. Cephalic aspect of head. Female. El Alto de la Union, Oriente, Cuba. (Enlarged.)

Fig. 7. *Epilampra insularis* Bolivar. Dorsal aspect of supra-anal plate of female. El Alto de la Union, Oriente, Cuba. (Greatly enlarged.)

Fig. 8. *Epilampra insularis* Bolivar. Ventral aspect of apex of abdomen of female. El Alto de la Union, Oriente, Cuba. ($\times 1\frac{1}{2}$.)

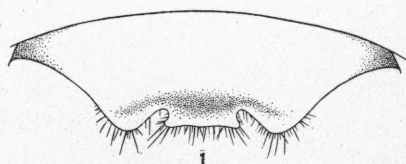
Fig. 9. *Epilampra tainana*, new species. Dorsal view. Female (type). Monte Libano, Oriente, Cuba. ($\times 1\frac{1}{2}$.)

Fig. 10. *Epilampra tainana*, new species. Cephalic aspect of head. Female (type). Monte Libano, Oriente, Cuba. (Enlarged.)

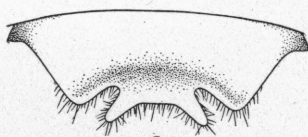
Fig. 11. *Epilampra tainana*, new species. Ventral aspect of apex of abdomen of female (type). Monte Libano, Oriente, Cuba. ($\times 1\frac{1}{2}$.)

Fig. 12. *Epilampra mona*, new species. Cephalic aspect of head. Female (type). Playa Sardinera, Mona Island. (Enlarged.)

Fig. 13. *Epilampra mona*, new species. Dorsal aspect of supra-anal plate of female (type). Playa Sardinera, Mona Island. (Greatly enlarged.)



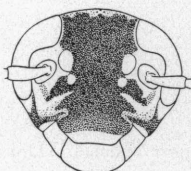
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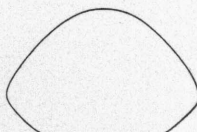
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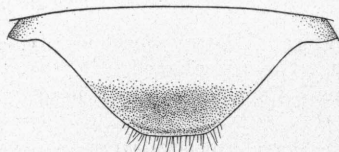
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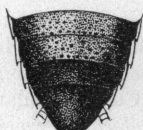
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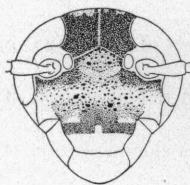
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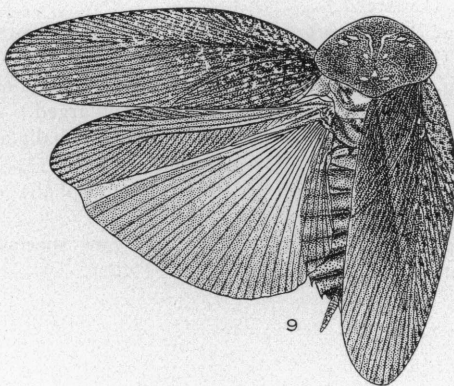
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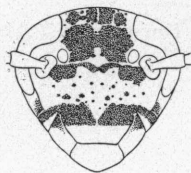
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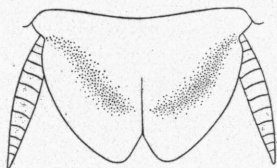
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PLATE XVII

Fig. 1. *Epilampra mona*, new species. Dorsal view. Female (type). Playa Sardinera, Mona Island. ($\times 2$.)

Fig. 2. *Epilampra abdomen-nigrum* (DeGeer). Cephalic aspect of head. Female. Grenada, British West Indies. (Enlarged.)

Fig. 3. *Epilampra abdomen-nigrum* (DeGeer). Dorsal aspect of supra-anal plate of female. Grenada, British West Indies. (Greatly enlarged.)

Fig. 4. *Epilampra gundlachi*, new species. Cephalic aspect of head. Male (type). Baracoa, Oriente, Cuba. (Enlarged.)

Fig. 5. *Epilampra gundlachi*, new species. Dorsal aspect of supra-anal of male (type). Baracoa, Oriente, Cuba. (Greatly enlarged.)

Fig. 6. *Epilampra burmeisteri* (Guérin). Cephalic aspect of head. Male. Cuba. (Enlarged.)

Fig. 7. *Epilampra burmeisteri* (Guérin). Dorsal aspect of supra-anal plate of male. Cuba. (Greatly enlarged.)

Fig. 8. *Epilampra wheeleri* Rehn. Cephalic aspect of dorsal section of head. Male. Adjuntas, Porto Rico. (Greatly enlarged.)

Fig. 9. *Epilampra wheeleri* Rehn. Cephalic aspect of dorsal section of head. Female. Porto Rico. (Greatly enlarged.)

Fig. 10. *Epilampra wheeleri* Rehn. Cephalic aspect of head. Female. Porto Rico. (Enlarged.)

Fig. 11. *Epilampra quisqueiana*, new species. Dorsal view. Male (type). San Lorenzo, Dominican Republic. ($\times 2$.)

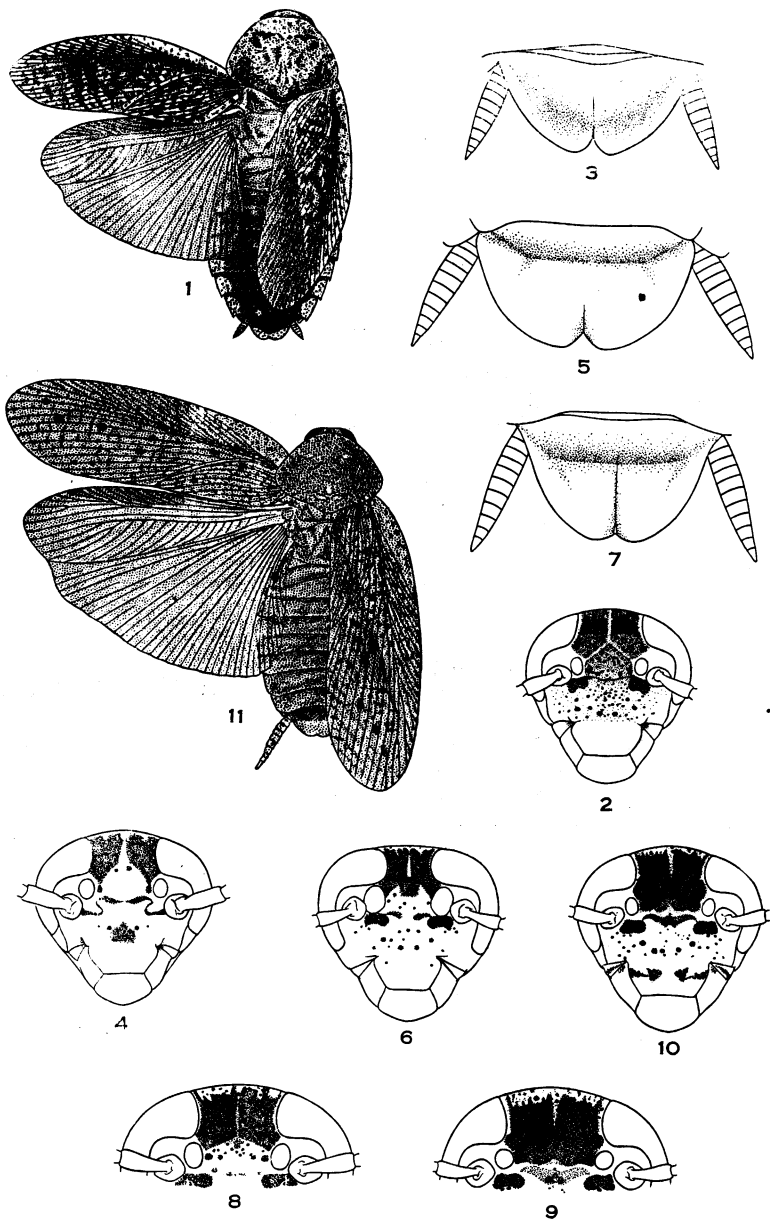


PLATE XVIII

Fig. 1. *Epilampra gundlachi*, new species. Sinistral tegmen. Male (type). Baracoa, Oriente, Cuba. ($\times 2\frac{2}{5}$.)

Fig. 2. *Epilampra gundlachi*, new species. Sinistral wing. Male (type). Baracoa, Oriente, Cuba. ($\times 2\frac{2}{5}$.)

Fig. 3. *Epilampra burmeisteri* (Guérin). Sinistral tegmen. Male. Cuba. ($\times 2\frac{2}{5}$.)

Fig. 4. *Epilampra burmeisteri* (Guérin). Sinistral wing. Male. Cuba. ($\times 2\frac{2}{5}$.)

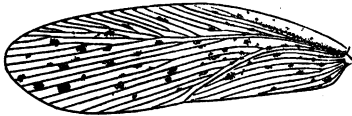
Fig. 5. *Calolampra aliena*, new species. Dorsal view. Male (type). Haiti. ($\times 2\frac{2}{5}$.)

Fig. 6. *Epilampra quisqueiana*, new species. Cephalic aspect of head. Male (type). San Lorenzo, Dominican Republic. (Enlarged.)

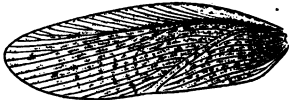
Fig. 7. *Calolampra aliena*, new species. Cephalic aspect of head. Male (type). Haiti. (Enlarged.)

Fig. 8. *Calolampra aliena*, new species. Dorsal aspect of supra-anal plate of male (type). Haiti. (Greatly enlarged.)

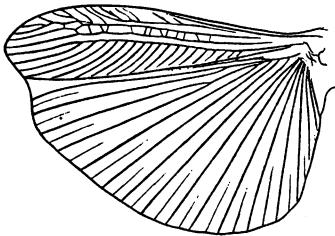
Fig. 9. *Calolampra aliena*, new species. Ventral aspect of subgenital plate of male (type). Haiti. (Greatly enlarged.)



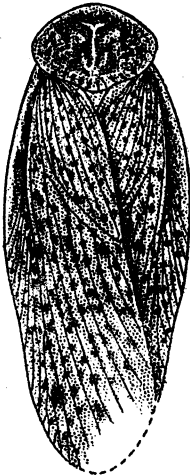
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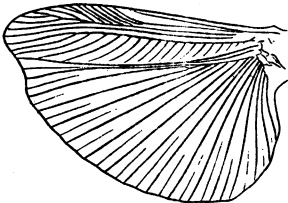
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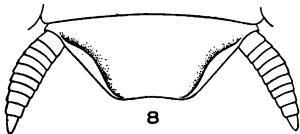
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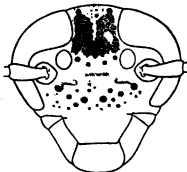
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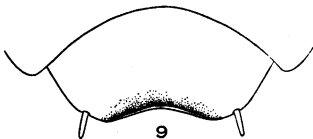
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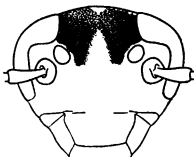
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PLATE XIX

Fig. 1. *Panchlora sagax*, new species. Ventral aspect of apex of abdomen. Male (type). Long Ditton, Dominica. (Greatly enlarged.)

Fig. 2. *Panchlora sagax*, new species. Dorsal outline of pronotum. Male (type). Long Ditton, Dominica. ($\times 4$.)

Fig. 3. *Panchlora sagax*, new species. Cephalic aspect of dorsal section of head. Male (type). Long Ditton, Dominica. (Greatly enlarged.)

Fig. 4. *Panchlora sagax*, new species. Ventral aspect of apex of abdomen. Female (allotype). Laudet, Dominica. (Greatly enlarged.)

Fig. 5. *Panchlora antillarum* Saussure. Cephalic aspect of dorsal section of head. Male. Higural, Dominican Republic. (Greatly enlarged.)

Fig. 6. *Panchlora antillarum* Saussure. Ventral aspect of apex of abdomen. Male. Higural, Dominican Republic. (Greatly enlarged.)

Fig. 7. *Panchlora antillarum* Saussure. Dorsal outline of pronotum. Male. Higural, Dominican Republic. ($\times 4$.)

Fig. 8. *Blaberus discoidalis* Serville, Dorsal view. Male. Ferry River, Jamaica. (Natural size.)

Fig. 9. *Hemiblabera tenebricosa*, new species. Dorsal view. Male (type). Santiago de los Caballeros, Dominican Republic. (Natural size.)

Fig. 10. *Hemiblabera tenebricosa*, new species. Dorsal view. Female (allotype). Puerto Plata, Dominican Republic. (Natural size.)

Fig. 11. *Hemiblabera tenebricosa*, new species. Outline of cephalic femur. Female (allotype). Puerto Plata, Dominican Republic. (Greatly enlarged.)

Fig. 12. *Hemiblabera pabulator*, new species. Dorsal view. Male (type). Mangrove Cay, Bahamas. (Natural size.)

Fig. 13. *Hemiblabera pabulator*, new species. Dorsal outline of tegmina. Female (allotype). Nassau, Bahamas. ($\times 1\frac{1}{4}$.)

Fig. 14. *Aspiduchus deplanatus* (Saussure). Outline of cephalic femur. Male. Corozal, Porto Rico. (Greatly enlarged.)

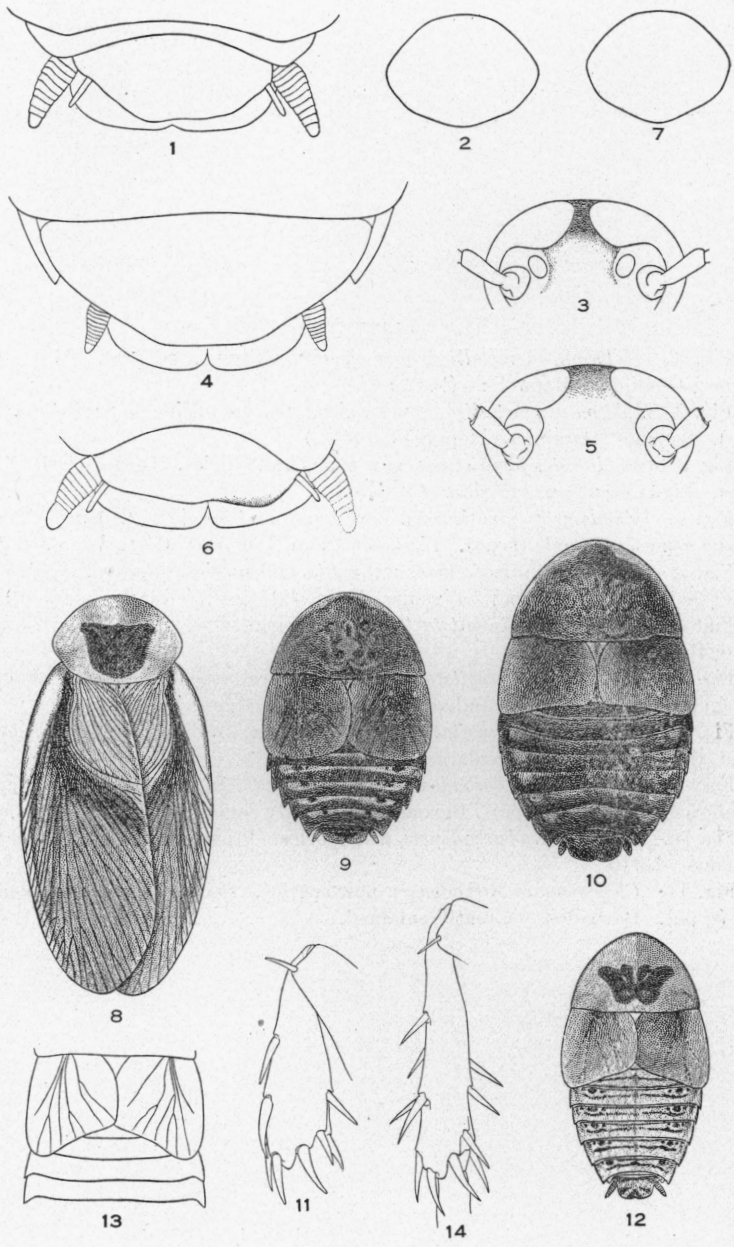


PLATE XX

Fig. 1. *Holocompsa metallica*, new species. Dextral tegmen. Male (type). Sanchez, Dominican Republic. ($\times 12$.)

Fig. 2. *Holocompsa metallica*, new species. Dorsal outline of pronotum. Male (type). Sanchez, Dominican Republic. ($\times 12$.)

Fig. 3. *Simblerastes jamaicensis*, new genus and species. Dorsal view. Female (type). Liguanea Plain, Jamaica. ($\times 8\frac{1}{2}$.)

Fig. 4. *Simblerastes jamaicensis*, new genus and species. Outline of head in cephalic aspect. Female (type). Liguanea Plain, Jamaica. (Greatly enlarged.)

Fig. 5. *Simblerastes jamaicensis*, new genus and species. Ventral aspect of subgenital plate of female (type). Liguanea Plain, Jamaica. (Greatly enlarged.)

Fig. 6. *Pholadoblatta inusitata* (Rehn). Dorsal view. Male (type). Andros Island, Bahamas. ($\times 11$.)

Fig. 7. *Pholadoblatta inusitata* (Rehn). Ventral aspect of subgenital plate of male (type). Andros Island, Bahamas. (Greatly enlarged.)

Fig. 8. *Pholadoblatta inusitata* (Rehn). Caudal limb. Male (type). Andros Island, Bahamas. (Greatly enlarged.)

Fig. 9. *Chorisoneura barbadensis*, new species. Interspace between eyes in cephalic aspect. Male (type). Barbados. (Greatly enlarged.)

Fig. 10. *Chorisoneura barbadensis*, new species. Pronotal pattern. Male (type). Barbados. ($\times 10$.)

Fig. 11. *Chorisoneura barbadensis*, new species. Styles and subgenital plate of male (type). Barbados. (Greatly enlarged.)

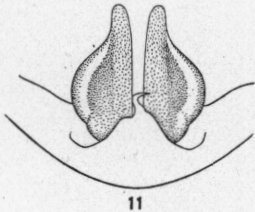
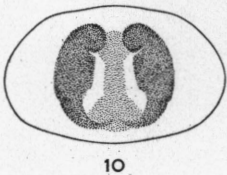
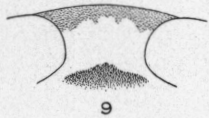
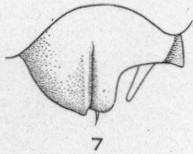
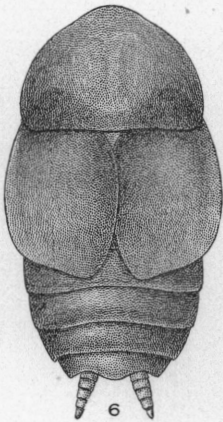
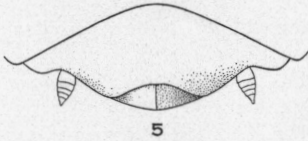
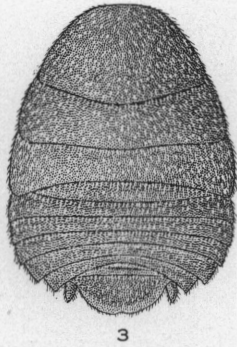
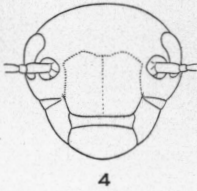
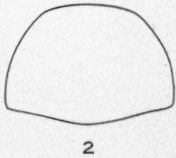
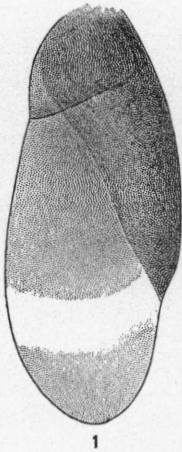


PLATE XXI

Fig. 1. *Plectoptera porcellana* (Saussure). Dorsal view. Male. Cayamas, Oriente, Cuba. ($\times 8\frac{1}{2}$.)

Fig. 2. *Plectoptera porcellana* (Saussure). Dorsal view. Male. Cayamas, Oriente, Cuba. ($\times 8\frac{1}{2}$.)

Fig. 3. *Plectoptera porcellana* (Saussure). Dorsal view. Female. Cayamas, Oriente, Cuba. ($\times 8\frac{1}{2}$.)

Fig. 4. *Plectoptera porcellana* (Saussure). Dorsal view. Female. Cayamas, Oriente, Cuba. ($\times 8\frac{1}{2}$.)

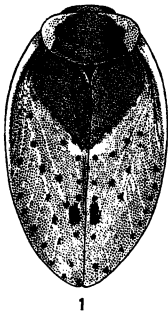
Fig. 5. *Plectoptera dorsalis* (Burmeister). Dorsal view. Male. Aibonito, Porto Rico. ($\times 8$.)

Fig. 6. *Plectoptera pygmæa* (Beauvois). Dorsal view. Male. Stony Hill, Jamaica. ($\times 8$.)

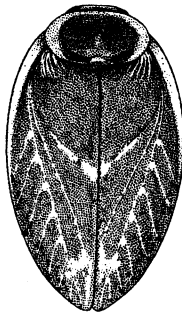
Fig. 7. *Plectoptera pygmæa* (Beauvois). Dorsal view. Female. Montego Bay, Jamaica. ($\times 8$.)

Fig. 8. *Plectoptera rhabdota*, new species. Dorsal view. Male (type). San Juan, Porto Rico. ($\times 8$.)

Fig. 9. *Plectoptera rhabdota*, new species. Dorsal view. Female (allotype). Aibonito, Porto Rico. ($\times 8$.)



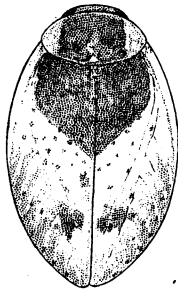
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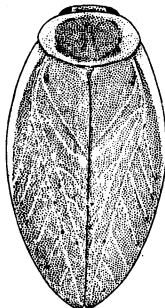
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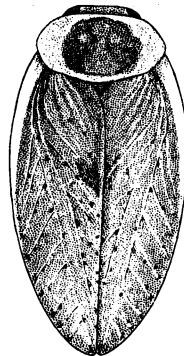
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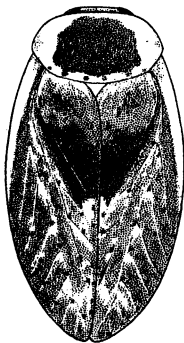
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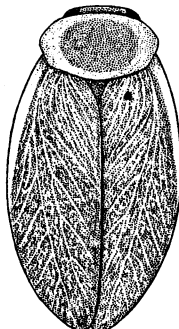
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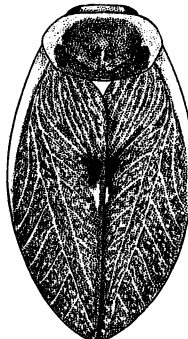
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PLATE XXII

Fig. 1. *Plectoptera perscita*, new species. Dorsal view. Male (type). Laudet, Dominica. ($\times 8$.)

Fig. 2. *Plectoptera vermiculata*, new species. Dorsal view. Male (type). Cayamas, Oriente, Cuba. ($\times 8\frac{1}{2}$.)

Fig. 3. *Plectoptera lacerna*, new species. Dorsal view. Male (type). Merceditas, north of Viñales, Pinar del Rio, Cuba. ($\times 8\frac{1}{2}$.)

Details of areolate pattern of representative sections of tegmina embracing discoidal and median veins, briefly proximad of middle of tegmen. (Greatly enlarged.)

Fig. 4. *Plectoptera porcellana* (Saussure). Male. Cayamas, Oriente, Cuba.

Fig. 5. *Plectoptera porcellana* (Saussure). Female. Cayamas, Oriente, Cuba. [Specimen figured in Plate XXI, figure 3.]

Fig. 6. *Plectoptera porcellana* (Saussure). Female. Cayamas, Oriente, Cuba. [Specimen figured in Plate XXI, figure 4.]

Fig. 7. *Plectoptera dorsalis* (Burmeister). Male. Aibonito, Porto Rico. [Specimen figured in Plate XXI, figure 5.]

Fig. 8. *Plectoptera pygmaea* (Beauvois). Female. Montego Bay, Jamaica. [Specimen figured in Plate XXI, figure 7.]

Fig. 9. *Plectoptera rhabdota*, new species. Male (type). San Juan, Porto Rico. [Specimen figured in Plate XXI, figure 8.]

Fig. 10. *Plectoptera perscita*, new species. Male (type). Laudet, Dominica. [Specimen shown in figure 1 on this plate.]

Fig. 11. *Plectoptera vermiculata*, new species. Male (type). Cayamas, Oriente, Cuba. [Specimen shown in figure 2 on this plate.]

Fig. 12. *Plectoptera lacerna*, new species. Male (type). Merceditas, north of Viñales, Pinar del Rio, Cuba. [Specimen shown in figure 3 on this plate.]

Fig. 13. *Plectoptera dorsalis* (Burmeister). Pattern of ventral surface of subgenital plate of female. Mayaguez, Porto Rico. (Greatly enlarged.)

Fig. 14. *Plectoptera dorsalis* (Burmeister). Pattern of ventral surface of subgenital plate of female. Mayaguez, Porto Rico. (Greatly enlarged.)

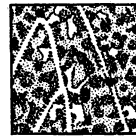
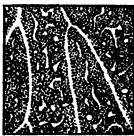
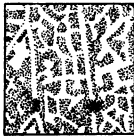
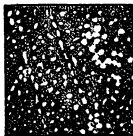
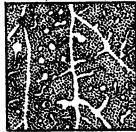
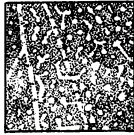
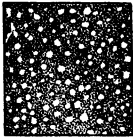
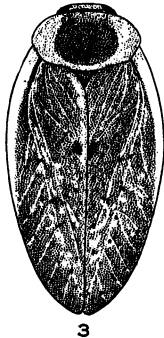
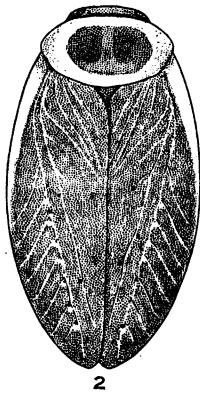
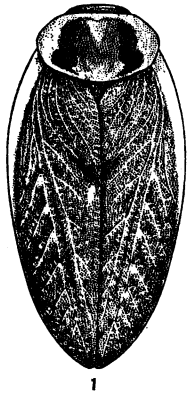


PLATE XXIII

Outline of distal margin of ventral surface of subgenital plate and styles of males.
(Greatly enlarged.)

Fig. 1. *Plectoptera porcellana* (Saussure). Cayamas, Oriente, Cuba. [Specimen figured in Plate XXI, figure 1.]

Fig. 2. *Plectoptera porcellana* (Saussure). Cayamas, Oriente, Cuba.

Fig. 3. *Plectoptera porcellana* (Saussure.) Cayamas, Oriente, Cuba.

Fig. 4. *Plectoptera dorsalis* (Burmeister). Arecibo, Porto Rico.

Fig. 5. *Plectoptera dorsalis* (Burmeister). Aibonito, Porto Rico.

Fig. 6. *Plectoptera pygmæa* (Beauvois). Stony Hill, Jamaica. [Specimen figured in Plate XXI, figure 6.]

Fig. 7. *Plectoptera rhabdota*, new species. Type. San Juan, Porto Rico. [Specimen figured in Plate XXI, figure 8.]

Fig. 8. *Plectoptera perscita*, new species. Type. Laudet, Dominica. [Specimen figured in Plate XXII, figure 1.]

Fig. 9. *Plectoptera vermiculata*, new species. Type. Cayamas, Oriente, Cuba. [Specimen figured in Plate XXII, figure 2.]

Fig. 10. *Plectoptera lacerna*, new species. Type. Merceditas, north of Viñales, Pinar del Rio, Cuba. [Specimen figured in Plate XXII, figure 3.]

Fig. 11. *Plectoptera infulata*, new species. Type. Mayaguez, Porto Rico.

Fig. 12. *Plectoptera dominicæ*, new species. Type. Laudet, Dominica.

Fig. 13. *Plectoptera dominicæ*, new species. Dorsal outline of pronotum. Male (type). Laudet, Dominica. (X12.)

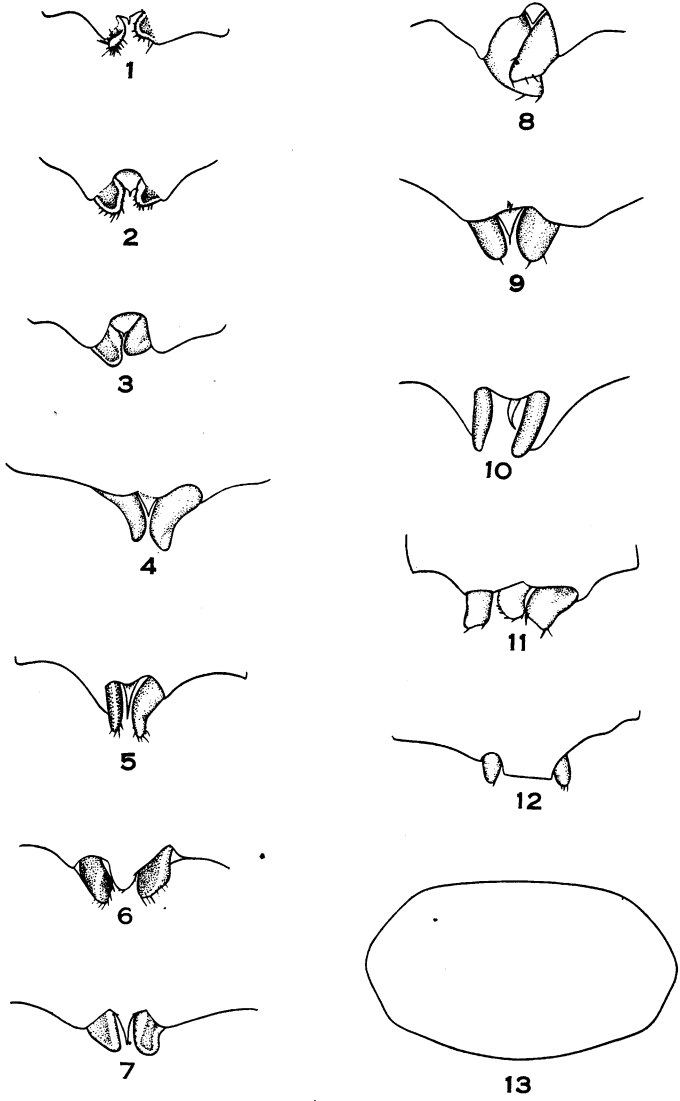


PLATE XXIV

Fig. 1. *Byrsotria cabreræ*, new species. Dorsal view. Male (type). Gibara, Oriente, Cuba. (Natural size.)

Fig. 2. *Byrsotria cabreræ*, new species. Dorsal view. Female (allotype). Gibara, Oriente, Cuba. (Natural size.)

Fig. 3. *Byrsotria fumigata* (Guérin). Dorsal outline. Male. Cabana, Havana, Cuba. (Natural size.)

Fig. 4. *Poroblatta rufipes* (Brunner). Dorsal view. Male. Union, Castries, St. Lucia. (×2.)

Fig. 5. *Poroblatta rufipes* (Brunner). Outline of dorsal aspect of apex of abdomen of male. Union, Castries, St. Lucia. (×4.)

Fig. 6. *Poroblatta rufipes* (Brunner). Ventral aspect of subgenital plate of male. Union, Castries, St. Lucia. (Greatly enlarged.)

Fig. 7. *Chorisoneura formosella*, new species. Pattern of pronotum. Female (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (×11.)

Fig. 8. *Chorisoneura formosella*, new species. Pattern of interocular portion of head. Female (type). Between Pleasant Hill and St. Helens Gap, Jamaica. (Greatly enlarged.)

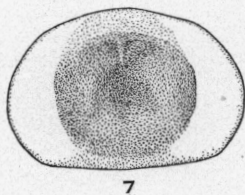
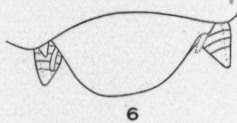
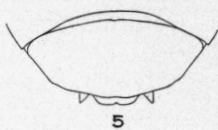
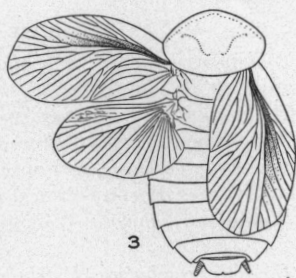
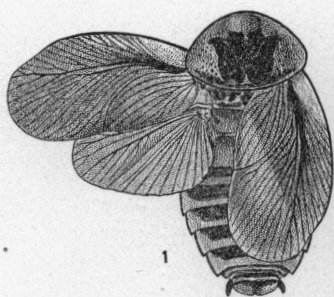


PLATE XXV

Fig. 1. *Epilampra haitensis*, new species. Dorsal view. Male (type). Port-au-Prince, Haiti. ($\times 2\frac{1}{2}$.)

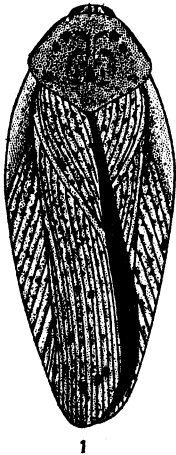
Fig. 2. *Epilampra haitensis*, new species. Pattern of interocular region and upper face. Male (type). Port-au-Prince, Haiti. (Greatly enlarged.)

Fig. 3. *Epilampra haitensis*, new species. Pattern of distal section of venter of abdomen. Male (type). Port-au-Prince, Haiti. (Enlarged.)

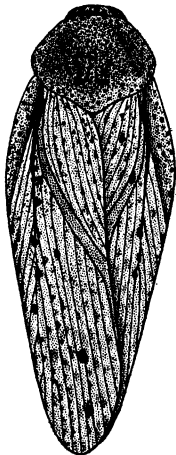
Fig. 4. *Epilampra sabulosa* Walker. Dorsal view. Male. Bourbon, Haiti. ($2\frac{1}{2}$.)

Fig. 5. *Epilampra sabulosa* Walker. Pattern of interocular region and face. Male. Bourdon, Haiti. (Greatly enlarged.)

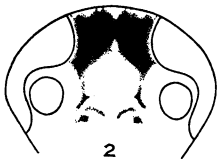
Fig. 6. *Epilampra sabulosa* Walker. Pattern of distal section of venter of abdomen. Male. Bourdon, Haiti. (Enlarged.)



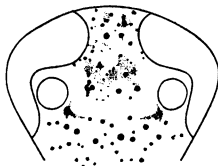
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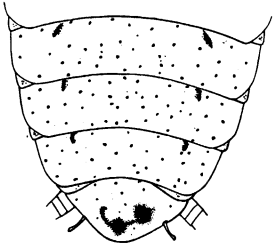
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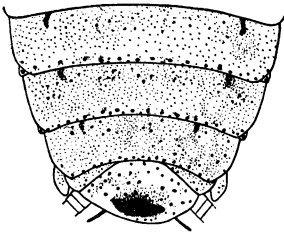
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